

INSIDE: WHEN IT MAKES SENSE TO CUT TREES

Montana Outdoors

MONTANA FISH, WILDLIFE & PARKS | \$2.50

NOVEMBER-DECEMBER 2012



AIRBORNE!

The northern flying squirrel's
amazing aerodynamic adaptations

IN THIS ISSUE:

FLY-FISHING WITH MITTENS

LEARNING TO LOVE ICE FISHING

GETTING TO THE ESSENCE OF WHY WE HUNT

DO WOLVERINES LIVE IN THE CABINET MOUNTAINS?



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Montana Outdoors

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COLD PLAY A fly-angler wades the icy Missouri River in midwinter. See page 28 to learn why, despite appearances, he's actually having fun. Photo by Will Jordan.

FRONT COVER For the latest discoveries on Montana's remarkable flying squirrels, see page 10. Photo by Alexander Badyaev.

Protein insufficiency and predatory bear attacks

I read with great interest the article "Terror at Soda Butte" in your September-October issue. I was surprised FWP bear management specialist Kevin Frey made no mention of the reintroduction of wolves, which compete with bears for prey, or the lack of whitebark pine nuts as potential contributing factors to the Soda Butte grizzly's need for a new source of protein. I'd be very interested to learn his thoughts on how these factors might affect grizzly bear behavior.

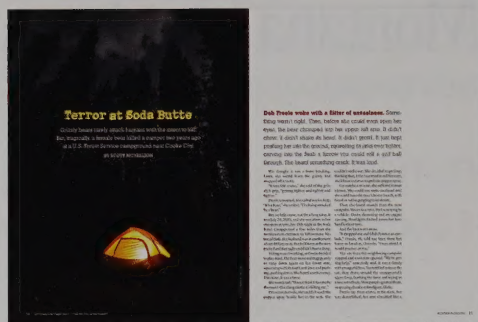
Will Osborne
Bozeman

KEVIN FREY RESPONDS: The wolf reintroduction has definitely reduced and changed the distribution of elk on the northern range of Yellowstone National Park (YNP), which I believe Mr. Osborne is referring to. However, the far northeastern corner of the park, including the Cooke City area, never has had abundant elk or elk winter range. Wolves haven't changed that there.

It's true that whitebark pines have been hit hard by blister rust disease and pine beetle infestations. Even so, there are still literally millions of whitebark trees in the Greater Yellowstone Ecosystem. Additionally, the whitebark pine stands near Cooke City remain fairly intact. Historically, whitebark pines produce a cone crop on average every other year. Bears have evolved to adjust to this periodic loss of high-caloric nuts and utilize other food sources. As for 2010, late July was too early in the year for cone seed availability to have been a factor in this incident. The seeds are not generally available to bears until late August.

Also, 2009 was a good year for whitebark pine in the Cooke City area, and this bear did not utilize that food source that year.

I don't believe this bear's behavior was "altered." What it did was



highly unusual but not beyond what grizzlies and other large carnivores occasionally do naturally. Throughout history and the world, bears, wolves, lions, and other large predators sometimes kill and consume humans. With the increase in grizzly bear numbers and distribution around YNP, it's likely there will be more potentially dangerous close encounters between bears and humans. But it's also likely that most of those encounters will come from bears being surprised or feeling threatened, not viewing humans as food.

The incident at Soda Butte was a tragedy; it was also an anomaly. Throughout the grizzly's range in North America, there are thousands of situations each year where a bear could attack and kill a camper, hiker, hunter, or other person. But the animals almost never do. The fact that predatory attacks from large carnivores are rare give all of us some level of comfort and allow us to venture into the wild. But we must never forget that if we want to have places that are truly wild, then humans won't always be the dominant species and the potential for attack, however slim, will remain.

No need for alarm

Your July-August issue of *Montana Outdoors* contained a very thorough article on Cherry Creek. It appears that you are trying to "improve" the stream by poisoning brook, rainbow, and Yellowstone cutthroat trout to establish a native cutthroat trout species that was present

200 years ago. There must be other waters in Montana that are more critical habitats in need of improvement, especially considering that you probably spent

\$1 million on Cherry Creek. I was quite alarmed reading this article.

Dennis Hanson
Merrifield, MN

Restoring westslope cutthroat trout, Montana's state fish and a species that has been targeted for possible listing under the Endangered Species Act, is one of FWP's top fisheries management priorities in western Montana. Almost all of the project's costs were paid by the private landowner and the U.S. Forest Service.

Watch FWP closely

I was disappointed to read FWP director Joe Maurier's comments on wolf management ("Our Point of View," September-October). Because hunting was never given a serious effort to reduce wolf numbers, the department now plans to vastly increase the wolf kill through trapping, giving in to a small but very vocal group of hunters and livestock producers. This in spite of the fact that wolf predation is but a tiny percent of overall livestock losses, and, except in a few local areas, of elk mortality.

The director then assures readers that the department has "safeguards" in place to protect the wolf population. But he never mentions what those safeguards are, nor how many wolves the department will allow to be killed this season. Further, he shows little concern about subjecting these highly intelligent animals to the cruelty of the leghold trap, instead referring to trapping as

a "management tool." Unfortunately, FWP appears to be in bed with anti-wolf groups, which advocate eliminating all wolves from the landscape. The department's actions are suspect and must be watched closely.

Michael H. Koeppen
Florence

War-time reading

I am a lifetime Montanan who is currently deployed in Afghanistan. My friends and family back home have sent me several issues of *Montana Outdoors*, and the magazine has been a great reminder of home. I have some issues posted around our "office." I thought you would



enjoy this photo. I'm standing here in front of an MATV (mine-resistant all-terrain vehicle) in eastern Afghanistan.

Second Lieutenant Aaron Greer
Kalispell

Correction

Several readers wrote or called asking about the chokecherry jelly recipe in the September-October issue ("Eating the Outdoors"). An editing error resulted in the recipe calling for "¾ c. juice." The actual recipe listed by the Montana State University Extension Office and submitted by the author calls for "3½ c. juice."

Pheasant Calvados

By Tom Dickson

Prep Time: 15 min.

Cook Time: 30 min.

Serves: 4 to 6



INGREDIENTS

- 5 T. unsalted butter
- 2 pheasants, quartered (thighs and split breasts; save legs for another use, such as stock or soup)
- 1 c. flour, seasoned with salt and pepper
- 4 large shallots, finely chopped (about $\frac{1}{3}$ c.)
- 4 oz. mushrooms, sliced
- 1 c. apple cider
- 1 c. chicken stock
- $\frac{1}{2}$ c. Calvados
- $\frac{1}{3}$ c. apple cider vinegar
- 1 Granny Smith apple—peeled, cored, and thinly sliced
- $\frac{1}{3}$ c. heavy cream
- $\frac{1}{3}$ c. dried currants
- 2 t. dried tarragon (or 2 T. fresh)
- 1 $\frac{1}{2}$ lbs. potatoes, mashed or boiled

PREPARATION

Begin cooking potatoes. Meanwhile, melt 4 T. butter in a large, deep skillet.

Dredge pheasant pieces in flour and shake off excess. Cook half the pieces over moderately high heat, turning once, until browned all over, about 8 minutes; transfer to a plate and keep warm. Repeat with remaining pheasant pieces. Do not overcook or meat will be dry.

Melt remaining butter in skillet. Add shallots. Cook over moderate heat until softened, about 3 minutes. Add mushrooms and cook about 5 minutes more. Add cider, stock, Calvados, and vinegar and simmer over moderately high heat, scraping up browned bits from the bottom of the pan, until slightly reduced, about 5 minutes.

Add apples and heavy cream and bring to a simmer. Return pheasant pieces to the skillet and simmer over moderately low heat until an instant-read thermometer inserted into the thickest piece registers 160° F, about 10 minutes. Transfer pheasant pieces to a warmed platter.

Add currants and tarragon to the skillet, stir, and season the sauce with salt and pepper. Finish cooking potatoes. To serve, layer pheasant pieces over potatoes and spoon sauce, rewarmed if necessary, over the top. ■

One day several years ago when my wife's sister and her husband, who live in Wales, were visiting, he offered to cook dinner. After a quick shopping trip in Helena, Graham returned with two frozen Cornish game hens (the ones tucked back in the freezer section with the turkeys), along with a Granny Smith apple, heavy cream, and a liter of Calvados (apple brandy). I didn't want to hover, so I watched from across the kitchen as he browned the quartered game hens in butter (after he'd thawed them thoroughly earlier in the day), then tossed the pieces into a large saucepan with sliced apples, cream, and a few globs of brandy. He brought the mixture to a boil, let it simmer 30 minutes, and served it on boiled new potatoes. Delicious.

After asking for seconds, I realized how well the technique would work for pheasants. One challenge with cooking this greatest of game birds (in my opinion) is to keep the breast from drying out. Cooking it in cream is a great solution.

Graham had no recipe to share ("I just sort of make it up as I go along"), so I went on-line and searched for something similar to what he'd prepared. The best and easiest I found was this recipe for game hens by Andrew Zimmern, Twin Cities food writer and television personality, which I adapted slightly for pheasants.

This would be an excellent holiday dish. The multiple layers of apple flavor give the luscious sauce a festive taste, and the cream and brandy make it decadent.

—Tom Dickson is editor of Montana Outdoors

Four years later

With the election of a new Montana governor, Fish, Wildlife & Parks will soon be led by a new director. This transition provides me with an opportunity to look back at the past four years and summarize the challenges and achievements I have been part of during that time.

Maybe the biggest challenge any FWP director faces is the sheer volume of public interest in the fish, wildlife, and parks we manage. With that passion come strong personal opinions—both outside this department and within—about how we manage wolves, elk, trout, state parks, fishing, hunting, and other natural and cultural resources. Those strong opinions are valuable. They have helped Montana build nationally known elk populations and trout fisheries. But I'd be lying if I said some of the most adamant viewpoints didn't make my job extremely difficult at times, especially when they clashed with department positions or policies.

Also challenging has been the rancor surrounding the role and value of nonresident hunters and anglers in Montana. I understand the frustration that comes from seeing out-of-staters anchored in your favorite fishing spot. Or learning that private land once open to public hunting is now closed except to paying customers, in many cases not from Montana. But nonresidents are as passionate about hunting and fishing as Montanans are. They care about conservation, too. If we are concerned about the declining public interest in hunting and fishing and the resulting loss of conservation advocates—which we should be—then we should not disparage those who come to Montana from elsewhere to hunt and fish.

Also, nonresidents pay most of the freight around here. About two-thirds of the license revenue going to our Division of Fish and Wildlife—for things like biologists' salaries, money for public access and habitat acquisition, and funding for fish and wildlife population monitoring—comes from nonresidents.

The attitude by many people toward landowners also troubles me. I recognize the

important fact that Montana's wildlife is held by the state in the public trust. Still, a large proportion of our elk, deer, pheasants, and other wildlife live on private land. Many private landowners protect and even enhance fish and wildlife habitat. We should appreciate and encourage those actions, just as Aldo Leopold did when he wrote, in 1934, "Conservation will ultimately boil down to rewarding the private landowner who conserves the public interest."

Fortunately, that is happening throughout Montana, with various state and federal conservation programs. Most significant is Block Management, which opens up 8 million acres of private land to public hunting. We need to do even more to both improve that program and find other ways to increase access to wildlife.

Despite these and other challenges, this department has made great headway in the last four years. Among the achievements I'm most proud of are our permanent land acquisitions, totaling more than 100,000 acres, including Marshall Creek, Fish Creek, Yellowstone, Marias, North Shore (Flathead Lake), and Spotted Dog Wildlife Management Areas, along with many conservation easements and new fishing access sites.

I also think we've made significant progress in establishing FWP's Parks Division as an independent entity and positioning it to market and manage Bannack, Lewis and Clark Caverns, Makoshika, Chief Plenty Coups, and the rest of our remarkable state parks.

Especially rewarding has been my role in helping create the Montana Wild Conservation Education Center in Helena. Whenever I visit that restored foundry, now filled with kids and their parents learning about wildlife, fish, and Montana's long-standing tradition of citizen involvement in conservation, I feel great about this state. Many Montanans can share the credit for making that facility possible, and it has been my honor to help them.

I love to be outdoors, to take in the intoxicating sights and smells and sounds of the natural resources this department is entrusted to conserve and manage. I suspect that years from now, as I drive past Montana Wild and think of its role in getting young people as committed to the outdoors as I am, my role in helping create that facility will provide my greatest sense of professional accomplishment.

—Joe Maurier, Montana FWP Director



GRAND OPENING A ribbon-cutting ceremony was held in September to inaugurate Montana Wild. From left to right: Vince Yannone (FWP retired), Kelly Kuntz and Cindy Utterback (Foundation for Animals), Chris Smith (FWP retired), First Lady Nancy Schweitzer, Thomas Baumeister (FWP), and Joe Maurier.



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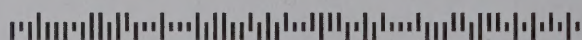
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JESSE LEE VARNADO

ALL-SPECIES MANAGEMENT

RYAN RAUSCHER

FWP Wildlife Biologist, Conrad

I'VE ALWAYS BEEN INTERESTED in wildlife of all types. Before I became a biologist, I did a lot of hunting and trapping. My dad was quite a hunter, and in fact he once had the number one typical Boone and Crockett mule deer in Montana. It hung over our family's fireplace for years.

My first job with FWP was as a nongame wildlife technician, and that really added to my understanding and enjoyment of songbirds, amphibians, and those species that aren't hunted. Later I was the native species biologist in Great Falls—where I acquired that magpie mount in the photo—and then in Glasgow. That's where I really melded my game and nongame responsibilities, because I also managed furbearers, worked on mountain lions and moose, and was involved in other game species management.

I'm not alone in my interest in the full spectrum of wildlife. I've

rarely met a hunter whose enjoyment of the outdoors isn't enhanced by nongame species and who doesn't recognize that these other animals are part of the full experience of being outdoors. I vividly remember one afternoon while elk hunting in the Gallatin Range when I watched a long-tailed weasel for about an hour with a hunter I happened to meet. His excitement for the day wasn't about hunting elk; it was about watching that weasel hunt.

For me, that notion hits home every time I'm turkey hunting and hear a black-capped chickadee sing, welcoming spring.

This fall I left my position in Glasgow and started working as the wildlife biologist in Conrad, about 12 miles from where I grew up and where my great-grandfather homesteaded in 1908. I had my eye on the job in Conrad from the day I started college. It only took 22 years, 7 months, and 9 days to get it. 🐾

"I ended up with a chilly, wet, and dirty rear end from taking this photo," says photographer **JOHN SHARKEY** of Helena. "We were up at Benton Lake National Wildlife Refuge north of Great Falls on the driving loop, in early December, when I spotted this great horned owl sitting on a rock, waiting for voles and mice to scurry across a little wetland draw. I got out and walked closer, stopping and waiting, then walking a bit more. Finally I sat down and scooted on my butt to get within about 30 yards." Sharkey says he was struck by two things as he watched the large owl for the next half hour. "One was how delicately thin his 'horns' [ear tufts] were. The other was how colorful and well barred he was. Usually great horned owls are much grayer, but this one was especially beautiful. In most owl photographs they are looking right at you. What I like about this shot is that it shows the back of the bird. It's not an angle you usually see." ■





4

Percent of elk hunters who kill a 6x6 or bigger bull in Montana each season.

On his way

Al Troth, longtime Montana fishing guide and inventor of the popular Elk Hair Caddis fly pattern, died on August 3. He was 82 years old.

Troth grew up in Pennsylvania, taught high school there, and visited Montana in summers to trout fish. He moved his family to Dillon in 1973 and took up guiding on the Big Hole, Beaverhead, and other rivers. He also tied flies for select clients.

Among his most inspired innovations was the Elk Hair Caddis, which over the past half-century has become the most widely used caddis pattern ever designed.

A friend of Troth's recently wrote on a fishing blog, as part of a discussion on the fly tier's life: "Man, that guy could fish. To all those big fish in heaven, you'd better watch out. Al's on his way." ■



The continent's green-winged teal are doing especially well this year, up 74 percent from the long-term average.

WILDLIFE

Duck numbers at historic highs

If you're seeing more ducks in the sky this fall, there's good reason. This past summer, the U.S. Fish and Wildlife Service reported that waterfowl production across North America was at a record high, despite deteriorating breeding habitat. This year's estimate of 48.6 million ducks is up 3 million from 2011 and 43 percent above the long-term average dating to 1955.

Among the highlights (numbers are the percent increase in 2012 over the long-term average):

- Mallard: +39
- Gadwall: +96
- Canvasback: +33
- Green-winged teal: +74
- Redhead: +89
- Blue-winged teal: +94
- Greater and lesser scaup (bluebill): +4

Jim Hansen, FWP's Central Flyway coordinator

in Billings, explains that the record numbers reflect strong production in 2011 throughout the Prairie Pothole Region, the continent's primary duck factory. "Last year's extremely wet weather created excellent wetland conditions," says Hansen. "Many of those ducks made it through the hunting season and the winter, and that's what biologists were seeing earlier this year when they made the waterfowl population forecast."

Unfortunately, says Hansen, this could be the end of the waterfowl boom for some time. "The biggest threat is large-scale conversion of Conservation Reserve Program nesting grasslands to increasingly valuable commodity crops like corn, wheat, and soybeans," he says. ■

ACCESS

Welcome bird hunters

Sharptail, pheasant, and duck hunters, rejoice. Another 17,000 acres of private grasslands and wetlands on 55 properties in eastern and north-central Montana have opened to hunting thanks to funding from a new federal program. Open Fields for Game Bird Hunters, part of the Farm Bill, gives grants to states to pay qualifying landowners a bonus for allowing public access on federal Conservation Reserve Program (CRP) grasslands and other good upland bird and waterfowl habitat. It is modeled in part after Montana's successful Block Management Program.

Debbie Hohler, FWP Upland Game Bird Enhancement Program coordinator, says small CRP and other grassland tracts generally aren't big enough to

qualify for Block Management. "But with Open Fields, we've been able to enroll tracts with as few as 80 acres that hold upland birds," she says.

"When you consider that we're now working with 55 new cooperators and have 17,000 new acres for walk-in hunting access, we feel like this has been a real success," Hohler adds.

Hohler says the Open Fields contracts range from five to ten years. "On average, the new upland hunting sites will be open for at least through 2020," she says. ■

- All areas are signed. No additional permission is required.
- Locate sites on downloadable county maps by visiting fwp.mt.gov/hunting/planahunt/ and searching for the Upland Game Bird Hunting Guide.



ISSUES

Bakken oil boom puts pressure on public wildlife areas and fishing access sites

FWP wildlife management areas (WMAs) and fishing access sites (FAS) are seeing growing use in recent years from the influx of workers and their families moving to the Bakken oil field in western North Dakota and eastern Montana.

The oil boom has created more than 20,000 jobs in the Williston Basin over the past two years, good news for both states' economies. But those workers are stressing housing, schools, sewage systems, law enforcement, and now local recreational facilities. "One example is that, because of the housing shortage in Richland County, we're seeing people setting up trailers for permanent living at WMAs," says Ken McDonald, FWP Wildlife Bureau chief.

FWP southeastern region Communications and Education Program manager Cathy Stewart says that this past summer she was amazed at the number of people floating, playing games, picnicking, and swimming at Gartside

Reservoir FAS, in Sidney. "Except no one was fishing," she says. "I walked through the parking lot and saw only two Montana plates of the 48 vehicles there. Most were from Oregon, Idaho, Minnesota, and California." Stewart visited with 35 visitors. All were either employed in the Bakken fields or were the spouse or child of someone employed there. "Every one of them had been in Montana for less than a year." ■



Trailers outside Sidney. The oil boom, while great for the state economy, is putting stress on public wildlife and fishing areas.

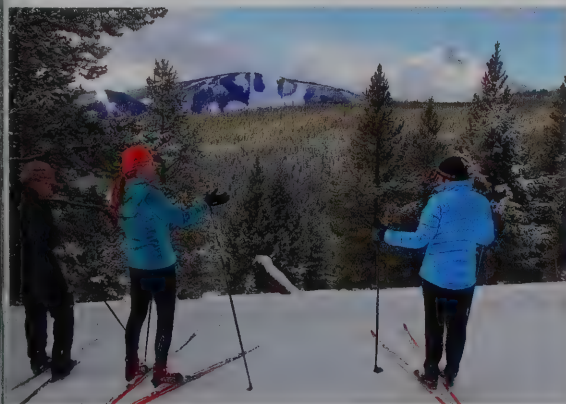
RECREATION

Montana's top skinny-ski spots

Becky Lomax, an outdoor writer in Whitefish, has been cross-country skiing around western Montana for 20-plus years. Though bushwhacking through the backcountry has its own appeal—greater solitude and more wildlife—Lomax says she most enjoys classic and skate skiing the groomed trails at Nordic ski centers. Her top picks

are listed below. All charge a daily fee except for Mount Haggin, which asks for a donation. Dogs are not allowed, except on certain loops at Homestake Lodge and Lone Mountain Ranch.

- ▶ **Stillwater Nordic Center**, 8 miles northwest of Whitefish in the Stillwater State Forest. Total trail length: 20K.
- ▶ **Izaak Walton Inn**, in Essex off U.S. Highway 2 on the south tip of Glacier National Park: 33K.
- ▶ **Seeley Creek Nordic Trails**, 1 mile from the town of Seeley Lake: 18K.
- ▶ **Mount Haggin Nordic Ski Area** on Mill Creek Road (Highway 274), 11 miles south of Montana Highway 1, near Anaconda: 20 K.
- ▶ **Homestake Lodge**, 3 miles south of Homestake Pass on I-90, 6 miles southeast of Butte: 37 K.
- ▶ **Rendezvous Ski Trails**, West Yellowstone: 35K.
- ▶ **Bohart Ranch**, 17 miles north of Bozeman up Bridger Canyon: 30K.
- ▶ **Lone Mountain Ranch**, Big Sky: 90K.
- ▶ **Red Lodge Nordic Center**, Red Lodge: 15K. ■



1K down and 89 more to go at Lone Mountain Ranch



Story recovered

In our article on Montana's top big game trophies ("Getting to No. 1," September-October), we were unable to locate the story behind the state's biggest moose. Here it is, sent in by Gary Schmauch, the hunter's son:

I accompanied my father, C.M. Schmauch, in 1952 when he was scouting the area where that moose was shot in the Red Rock Lakes area southeast of Dillon. One of the local ranchers said there was a big, old bull moose around there that seemed to disappear when hunting season rolled around. Everyone in the area called him Old Jingles, and they thought he would be close to a state record. Upon hearing that, my father, who was mostly a meat hunter, not a trophy hunter, jokingly replied, "That's the one I'll get."

This was the first and only time he received a moose permit during his many years hunting in Montana. That fall he actually passed up a couple of smaller bulls because they were in swampy areas and would have been difficult to get out. One day he saw this large bull moose some distance away in an open field. He maneuvered close enough to get a good shot, and dropped what turned out to be Old Jingles with a single shot from his .30-06.

Though venison was an important part of our family's groceries, my father would take a trophy animal if the opportunity arose. He had many fine elk and deer antlers, as well as the trophy from the record moose. Unfortunately, the antlers, which were destined for the Moose Lodge in Helena, were stolen and never recovered. ■

CATCHIN

A research scientist documents
the remarkable aerodynamic
adaptations of northern
flying squirrels.

G GREAT AIR



ARTICLE AND PHOTOGRAPHS BY
ALEXANDER V. BADYAEV

I spent the day in my research cabin north of Ovando in the Blackfoot River Valley poring through photographic equipment manuals to determine the lowest temperature of operation. Meanwhile, the radio was broadcasting severe winter weather warnings, with dangerously low overnight temperatures. Finally, I decided on a plan and headed into the forest.

A few hours later, after snowshoeing 6 or 7 miles into the backcountry, I stopped and began working in the diminishing February twilight. As quickly as possible in the freezing cold, I strung a rope of strobe lights along the branches of several trees. The lights were connected to a high-speed camera set on the ground and aimed at a gap in the tree canopy. The trees framed a tiny half-acre forest pond on the southern boundary of the Bob Marshall Wilderness. From previous field research by my graduate students and me, I knew that local female northern flying squirrels regularly travel along the shore of the pond. In winter, the squirrels emerge from roosting cavities shortly after midnight and range throughout the forest, traveling to their under-snow food caches by remarkably consistent routes. My goal was to photograph squirrels in flight in a natural context, something rarely documented.

Based on my previous observations, I expected one of the female squirrels I'd targeted to fly over the pond between 2:20 a.m. and 2:50 a.m. Unfortunately, the overnight temperature was predicted to plummet to -40 degrees F, greatly increasing the chance of camera failure. But the risks were worth it. In Montana, February is the middle of the northern flying squirrel's mating season. Even in severe cold, each female is typically escorted through the forest by a squabbling squadron of ardent males. I was hoping also to photograph those males and their dizzying aerial mating chases.

LAUNCHING SKYWARD To quickly gain elevation, flying squirrels push from the ground using powerful hind legs before opening their flying membrane and gliding to a nearby tree. Here a flying squirrel bursts from its cache of fir cones buried deep in the snow, leaving a potential intruder startled while gliding away to safety. "Walking through the forest at night, it's like champagne bottle corks popping around you," says the author. Such escapes are far less successful with raptors. Flying squirrels rustling noisily under snow become too confident in their explosive escape strategy and end up a staple winter food of great horned owls.



PREPARE FOR LANDING A flying squirrel's flattened tail adds an additional 25 percent of gliding surface. Just before landing, the squirrel drops its hips, bringing the hind feet forward and opening up the patagia—the membranes on each side of its body—into a speed-slowing parachute.

HIGH FLYER

The northern flying squirrel is one of two flying squirrel species in North America. The other is the smaller but almost identical southern flying squirrel. The species in Montana ranges across Canada and Alaska through the northern Rockies and Great Lakes states, down to Appalachia's cooler mountain zones as far south as North Carolina. The southern flying squirrel ranges across much of the eastern third of the United States from Florida north to the Great Lakes.

Flying squirrels feed on plant material, including seeds, nuts, and flowers, and also insects, bird eggs, and even meat scavenged from dead animals. Their passion for eating lichen, truffles, and other mush-

rooms helps spread the fungi's mycorrhizal spores, essential for conifer root growth, through forest ecosystems. What's more, when excavating fungi on the ground in the middle of the night, flying squirrels get so preoccupied with finding food they become highly vulnerable to great horned owls and great gray owls, their primary predators. The squirrel's role as a central link in the forest food chain makes it a "keystone species," one essential for maintaining the habitat's ecological integrity.

The flying squirrel is well known for its amazing ability to glide among tree trunks on its outstretched patagia (the expandable furred flaps of skin on either side of its body that stretch from the animal's neck to its ankles). For years, scientists assumed that fly-

ing squirrels were passive aerialists that used their gliding ability simply to prolong jumps across canopy gaps and lessen the impact of landing.

These assumptions recently became suspect, however, when laboratory studies uncovered several exceptional features of squirrel aerodynamics that strongly hinted the species might be capable of more than passive gliding. Time-lapse lab photos indicated that flying squirrels conducted airborne feats that aerodynamic theory suggested should be impossible for a species simply gliding through air.

In particular, studies found that airborne squirrels have an unusually high "angle of attack"—the angle between the gliding membrane and the direction of oncoming airflow. While greater angles generate greater lift, valuable for gaining midair height and distance, the angles observed in flying squirrels far exceed those sustained even by advanced military jets. In theory, the high angle should cause the

Alex Badyaev, a professor of evolutionary biology at the University of Arizona, conducts long-term field research projects throughout Montana, where he lives part time. Also a professional photographer, Badyaev was a winner of the 2011 BBC Wildlife Photographer of the Year and 2011 National Wildlife Photography awards. His recent photos are featured in a new book, Mammals of Montana.



MORE THAN JUST SOAR Scientists once thought flying squirrels could not actually fly but only glided, passively. Now researchers are thinking otherwise. Though the squirrels don't flap their patagia, they slightly adjust parts of their anatomy to increase lift and decrease air turbulence.

soaring squirrel to stall midair and crash.

Scientists also found that somehow the squirrels are able to eliminate the destabilizing forces of unequal air pressure above and below the patagia. These “mini-tornadoes” on either side of a jet’s wings are the cause of turbulence, and the force intensifies as the plane angles upward. With a squirrel’s high angle of attack, increased turbulence should greatly reduce its gliding distance and speed. But that doesn’t seem to be the case. How do they do it?

Scientists have also wondered why flying squirrels don’t crash. Simple calculations show that a squirrel landing from a routine 40-foot glide would hit a tree with an impact of more than 30 times its body weight unless it actively stalls well in advance of the landing. Yet such a stall would further decrease flight stability and duration. Based on what’s known about aerodynamics, flying squirrels should be confined to slow, short, and steady glides or risk constant crashes, stalls, and falls. Yet they soar

great distances. How is that possible?

Those were just some of the questions I hoped to answer as I knelt in the snow that frigid February night.

EYEWITNESS

Shortly after 2:30 a.m., under a nearly full moon, I was treated to a remarkable air show. It began with a cloud of snow kicked up by two males chasing each other on the upper branches of a spruce tree high over my head. One lost his grip then dove into a long glide over the pond, followed immediately by the second male in a rapidly accelerating glide.

Both landed in the upper canopy across the pond—seemingly without much loss of elevation; despite a glide of at least 60 feet—and resumed their squabble. Then I spotted a female sitting quietly on a snow-covered branch against a tree trunk, inspecting a large fir cone probably left by a red squirrel during the day. A few seconds later, another male parachuted down from a nearby tree, somehow steering the end of

his nearly vertical descent to land on the trunk right below the female.

The female crouched, and in an exceptionally powerful jump with a fully extended body and outstretched hind- and forelimbs, launched herself at a 40-degree angle high into the air. She kept her patagia completely folded until reaching a height of about 10 feet. Then she spread the membranes wide open and, lighted by a series of high-speed strobe flashes triggered by my camera, seemed to freeze in midair for a moment before gracefully gliding out of view across the snow-covered pond. After engaging in a few barely audible squabbles from across the frozen expanse, occasionally kicking up more snow dust, the squirrel group disappeared into the dark and the night’s silence was restored.

I was amazed. What I had witnessed and documented with my camera that and subsequent nights were a series of astonishing aerial accomplishments: 150-foot-long flights across open fields; midair



UNEXPECTED VISITORS The author's introduction to flying squirrels' aerial abilities came one winter while waiting for weasels at a wolf-killed deer in a vast field in a northern Montana forest. "To my surprise, what landed on the deer instead were flying squirrels, gliding in from trees 100 meters away," he says.

180-degree turns to evade attacking owls; vertical leaps so high the squirrels could then soar from midair into a tree—often while carrying a pine cone weighing nearly as much as itself. It was obvious this species is capable of much more than just simple static gliding.

I spent the rest of that night walking around to keep warm, watching an occasional owl for entertainment. At first light, I dismantled the by-then solidly frozen equipment with its long-dead batteries and started back to the cabin. I would spend many days afterward replaying and analyzing, frame-by-frame, the footage of those stunning performances to understand how the species has been able to solve major aerodynamic problems.

Foremost among these solutions is the squirrel's "wing tip"—a short rod of cartilage outside the wrist that the animal moves at various angles to enable exceptional flight control and precision landings. This anatomical novelty, like a sixth digit though not

attached to the others, is controlled by a powerful muscle. By adjusting the angle of the wing tip, the squirrel can generate a substantial lift, modifying the speed, distance, and trajectory of its glides midflight. This anatomical gliding innovation precedes the static endplates ("winglets") that NASA began installing on the wings of modern jets in the mid-1970s by at least 20 million years.

A flying squirrel's second novel physiological adaptation is the extensive musculature that crisscrosses its thin gliding membranes. These muscles, combined with limb movements during flight, allow a squirrel to actively modify the billowing of its "wings" and the orientation of fur on their surface. In a typical aerial chase, this produces wing shapes such as completely folded patagia during powerful take-offs; fully extended mem-

branes in the middle of long-distance glides; and fully inflated furry parachutes for slowing the squirrels' nearly vertical descents.

Finally, unlike many other gliding mammals (which include some primates and marsupials), flying squirrels have an additional fur-covered membrane between their neck and wrists they can curve down





GROUND-BREAKING DISCOVERY Using high-speed cameras, the author captured images of flying squirrels in the wild never photographed before. "I documented how they used the various anatomical adaptations that scientists had noticed in the lab but didn't know what they were used for," he says.

during flight. These "mini-patagia" guide air flow away from the larger patagia to lessen turbulence, while generating significant forward acceleration and lift.

In short, flying squirrels combine, in a small furry package, features of heavy transport planes, agile military jets, and flexible-wing parachute gliders. Its anatomy makes

the flying squirrel one of the world's most sophisticated mammalian gliders.

Scientists have long known that flying squirrels were loaded with excess anatomical abilities. But what purpose did they serve? Flying squirrels seemed overbuilt for simply gliding from one tree to another. My contribution from the nights spent in western Montana's frigid woods was to document in the wild how the squirrels use those remarkable features in flight. It turns out that flying squirrels are not just passive gliders. For instance, I saw them leap into the air from a tree trunk and then, as if forgetting something, turn 180 degrees in midair and return to the same trunk. And I witnessed that they can not only accelerate when gliding but also just as quickly decelerate just before landing so they don't smash into the destination tree.

Over millions of years, flying squirrels have come up with elegant solutions to the same aerodynamic problems that face modern aircraft engineers. Maybe flight scientists and others can learn from these small, furry mammals. If nothing else, we now know why a flying squirrel is equipped with these sophisticated features—to perform astonishing aerial maneuvers previously thought possible only in birds, bats, and other winged animals.

I have to wonder: What other marvels in these and Montana's many other mammal species are still out there waiting to be discovered? 🐿️

Want to see a flying squirrel in the wild? Badyaev recommends watching your bird feeder after midnight if you live in forested areas of western Montana where the squirrels frequent. "The main way people know they have flying squirrels around is they see the tails left behind by great horned owls that feed on them," he says.

BIOMIMICRY The flying squirrel possesses an amazing evolutionary innovation—a "wing tip." This cartilage at the outside of each wrist is held at variable angles to the rest of the "wing" to provide exceptional flight control and landing. It precedes the NASA-designed static winglets of modern jets by roughly 20 million years.



Trolls on Ice

How my son and some mythological creatures taught me the joys of fishing through frozen water. **BY BEN LONG**

If you're paying attention, parenthood will teach you something every day. Still, I didn't expect to get schooled by my seven-year-old son on any topic concerning Montana's Great Outdoors. I figured I was going to teach him.

I figured wrong.

One lesson I aimed to teach was this: If you want to live in Montana, you'd better learn to love winter. Our long nights and dark days have the power to plunge any perky little soul into a pit of despair.

For me, that annual psychological battle has meant skiing, ice-skating, playing pond hockey, and looking for wildlife tracks while snowshoeing. When the cold, leaden skies of northwestern Montana sink low, I like to keep moving.

Ice fishing was something different. I enjoy fishing when the August heat makes it a delight to wade a refreshing mountain stream. But when it came to ice fishing, I tended to agree with novelist and poet Jim Harrison, an avid outdoorsman, who once dubbed it the "moronic sport."

I was happy enough not ice fishing for 40 years or so. Then came my son, Aidan. He got turned on to ice fishing the most dangerous way—by a book. A relative from Norway sent him *The Trolls Go Fishing*, a cartoon book about how these mythological creatures catch fish in various ways, including through the ice.

The book triggered some recessive gene in Aidan's Nordic DNA. One winter afternoon when he was about five, I spied him sitting in our backyard, hunched over a hole he had dug in the snow, waving a stick over it. He stayed there for what seemed like an hour.

"What are you doing?" I finally asked.

"Ice fishing. Shhhh. They're down there."

I can take a hint. Besides, I'll do anything to get my kid outdoors and wrest him away from TV's *SpongeBob SquarePants*. It was my fatherly duty to take him ice fishing—even if I had to start from scratch.

One day while we were ice-skating at Foy's Lake, south of Kalispell, Aidan was drawn to a fellow in insulated Carharts, hunched over a hole. A couple of dandy rainbows flip-flopped on the ice. Figuring this was my chance to learn, I skated over.

"Nice trout," I said. "Whatcha using?"

The fellow just grunted: "Bait."

"Uh, huh. Sure. So, how deep are you?"

"A ways."

Lesson learned: Ice anglers aren't necessarily out there to make friends and socialize.

On our next outing, Aidan and I were on our own. I put his Lightning McQueen fishing rod, a hatchet, and an old jar of salmon eggs in a bucket. I drove us up to Rogers Lake, remembering something about Montana Fish, Wildlife & Parks occasionally stocking arctic grayling and cutthroat trout there.

I walked with Aidan onto the lake. After I chopped a hole into the ice with the hatchet, we lowered hooks baited with salmon eggs. The fish weren't interested.

I had brought along a tip-up purchased long before at a garage sale. Tip-ups are spring-loaded ice-fishing rigs that wave a flag when a fish takes the bait. The trolls in Aidan's book used one. I didn't bother tying a fishing line to it, but Aidan loved the gadget anyway. He played with it all afternoon, popping up the flag time after time while I stared at the hole in the ice, feeling incompetent.

My son came home that evening happy, but I was discontented. I consider myself a seasoned outdoorsman. Ice fishing was making me look like a fool in front of my own flesh and blood.

Then I remembered something helpful an older friend had told me shortly after Aidan was born. "Kids think you're Superman. It doesn't take much to impress them. If you can get the ball near the basket, they think you're Michael Jordan. You can drive a car, so that makes you A.J. Foyt."

Still, I wanted to catch a fish. Any fish would do.

Over the next two winters, our ice-fishing outings followed a pattern: drive to a new lake, chop another hole, and drive home empty-handed. Amazingly, Aidan's enthusiasm never waned.

About the time he turned seven, I decided to get a bit more serious. We went to the local sporting goods store.

"We want to catch perch," I said casually to the salesman. "You know, just something to keep the kid happy." I didn't mention I'd never caught a single perch in my entire life or that I was desperate to show some return for my previous countless hours on the ice.

He sold me a stubby little ice-fishing rod, a batch of diminutive hooks, and a little can full of wriggling pink maggots. I was happy

Longtime Montana Outdoors contributor Ben Long lives in Kalispell.

escaping for under \$40. Aidan was especially delighted with the maggots.

Then I read in our local newspaper's outdoors column about an ice-fishing derby at Murphy Lake the following weekend. "Aha!" I thought to myself. "Where there is a fishing derby, there must be fish!"

When Saturday came, I stuffed our bucket of gear, several armfuls of warm clothes, and Aidan into the car and drove to the derby site. It was quite a scene. On the surface of the 141-acre lake were about 200 anglers, some wandering around, others kneeling over holes, others buzzing about on ATVs and snow machines. There were little huts and people cooking on homemade barbecues made of half-barrels welded to pairs of old skis. Running about were scores of dogs, most of them somewhat resembling Labrador retrievers.

We were surrounded by experts, rugged veterans of the sport who would size us up as rookies in a glance. We ventured onto the ice, trying to look like we knew what we were doing. After all, we were there to catch a fish, even though both of us were bundled into so many clothes we could barely move.

What was ice-fishing etiquette? At first I was tempted to fish where others were fishing, because they appeared to have the knowledge I lacked. But I didn't want to infringe on their space, so we moved to the edge of the crowds.

Another problem: The ice was 2 feet thick, far beyond the chopping capability of my hatchet. I'd have as much luck trying to chop through the polar ice cap. I was gathering courage to borrow an auger from a fellow angler when Aidan found a recently abandoned hole. It was surrounded by frozen fish guts, which I took as a good sign. I skimmed off the thin film of ice in the hole.

One thing I've learned from elk and deer hunting is that skill isn't half as important as persistence. Put in your hours, and eventually luck will turn your way. We hooked a maggot and lowered it into the icy water. Then we waited.

As had been the case so many times that winter, nothing happened. I jigged the rod up and down, as instructed by the salesman at the sporting goods store. I handed the rod to Aidan, who jigged for a while before returning to play with the tip-up rig. Bored, I reeled in the line.

Lo and behold, a miracle occurred. There, somehow tethered to my line, was a bright and yellow creature, so small I did not feel a strike or resistance.

"Aidan! A fish! We caught a fish! It's a perch."

We flipped the little fish into our bucket. Aidan grabbed a scoop and began filling the bucket with water as the fish spluttered and flipped about. Our world had changed. We were ice fishermen.

Truth be told, I could end this story there. But more was to unfold. We kept on fishing.

Well, I fished. Aidan watched the little perch swim circles around the bottom of the bucket. He asked if we could take it home and keep it in the bathtub. Then my line went tight and the stubby little rod bent double.

My first thought, of course, was that I had snagged bottom. I tugged. The line tugged back. Fish on!

"Aidan! Get ready! We've got another fish. A *big* fish!"

I cranked and cranked. I loosened the drag on the reel to keep the line from snapping and kept the rod tip up. I figured any moment the knot would break.

I peered into the hole. Two bulging eyes stared back. Immediately I knew it was the biggest fish I had ever hooked in fresh water. Would it fit through the hole? Should I chop a bigger opening?

I heaved the fish up onto the frozen lake surface. I recognized it from the magazine covers: a largemouth bass. I quickly removed the hook and dropped the fish into our bucket. Aidan stood saucer-eyed. The fish gaped. So did I.

I ran over to a family who was fishing in a nearby hole.

"What's the rule on bass in this derby?" I asked.

"Biggest one wins. Did you catch a big one?"

"I think so. Come look."

The family's two boys raced back with me. They were, if anything, more excited than Aidan and I were. This was a fishing contest, after all. Our fish was a serious contender. They urged us to go get the fish weighed.

Aidan ran all the way across Murphy Lake to the wall tent where the event organizers were holding court. I followed, huffing and puffing, carrying the bucket. A buzz spread across the lake. Anglers put down their rods and came over to the tent to check out our catch. Aidan seemed to levitate with pride and excitement.

The tournament scale said 3.2 pounds, and the ruler showed the fish was nearly 18 inches long. That's not much of a bass in most of the United States, but here in cold, dark northwestern Montana, it's a wall hanger. When the bell rang, ending the

derby, our fish was the second-largest bass in the tournament, bested by a mere one-tenth of a pound. Aidan won a prize that would delight any seven-year-old boy: a propane torch.

I had to chuckle. The prize-winning bass was the first largemouth I had ever caught. It and the perch were the only fish I had ever pulled through the ice.

There's no luck like beginner's luck.

Aidan and I drove home changed men. We were ice fishermen. If Mr. Harrison wanted to call it the "moronic sport," then we were two of the happiest morons in all of Flathead County.

Come Christmas, I'm asking for an auger. 🐟



MONTANA MONSTER The author's son, Aidan, with their prize-winning largemouth bass.

BEN LONG



PLEASE ~~DO NOT~~ DISTURB

Why FWP is using
“low-intensity logging”
to mimic natural
disturbances on some
forested wildlife
management areas.

BY TOM DICKSON

Trees grow.

I come to this profound realization while spending a day exploring one of Montana's largest wildlife management areas (WMAs), 70,000-acre Mount Haggin, just south of Anaconda. More to the point, under certain conditions some trees grow more aggressively than others. As a result, they can reduce the value of forest habitat to certain wildlife species, especially elk, deer, moose, and many nesting songbirds.

Guiding me through the WMA and these forest ecology basics is Vanna Boccadori, Montana Fish, Wildlife & Parks wildlife biologist in Butte. She begins by pointing out the various ways trees benefit wildlife, such as providing food (leaves, buds, branches, bark, and flowers) and shelter (protection from predators, warmth in winter, shade in summer, and nesting and perching areas). All tree ages are important, Boccadori explains, ranging from young saplings browsed by moose calves to the toppled old-growth giants, which become home to ants that break down dead trees into soil. "Depending on the wildlife, certain tree and shrub species and ages are better than others," she says.

Improving the composition of Mount Haggin's tree species and ages to benefit wildlife—especially the elk, moose, and mule deer for which the land was purchased—is among Boccadori's many jobs. One way of doing that is with carefully prescribed timber harvest.

Wait a minute: Chopping down trees to benefit wildlife? That seems counterintuitive to those of us who've read for decades how logging *harms* wild animals. "It's true that timber harvest can be detrimental," Boccadori says. "But when done right, some tree removal can be a good thing."

SMOKEY'S LEGACY

The main reason is that logging can mimic the effects of low-intensity fires that for thou-

sands of years swept through today's western Montana. Sparked by lightning, or occasionally set by Native Americans to promote grass growth, the fires rarely burned too hot because "fuels"—thick stands of understory vegetation or toppled dead trees—rarely had time to accumulate. In dry stands on west- and south-facing slopes, fires snaked through forests every few decades, leaving behind biologically rich mosaics of charred, partially scorched, and unburned trees. Larger, older conifers survived. Their bark was thick

tuted a new policy of suppressing all forest fires. Ironically, an unintended result was that forests over the last century have actually grown more flammable. Understories of many protected stands grow dense and tight. As years pass, they fill with dead, downed trees. This can produce catastrophic fires—which have raged across parts of the West in recent decades—that burn entire forests down to sterile bare soil. Meanwhile the thick, dense tree growth in unburned areas degrades habitat for many wildlife species.

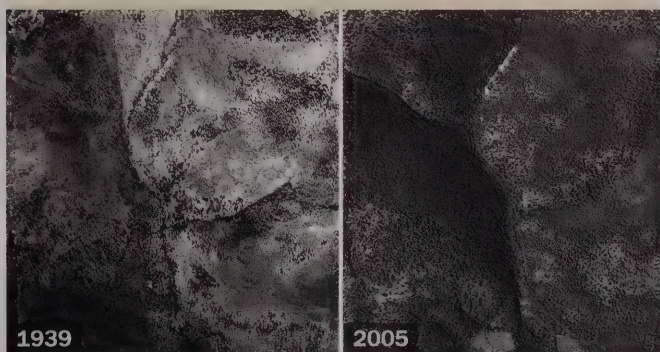
Sometimes, wildlife biologists and forest managers use "prescribed" burning to clear out understory below older trees. But burning in forests too thick with accumulated fuels can put neighboring lands at risk. Often a safer and more cost-effective option is mechanical forest management.

Call it "low-intensity logging."

At Mount Haggin, Boccadori and I hop into her pickup to see three such projects, carried out in the summers of 2010 and '11, and another soon to be underway.



CHOKED WITH GROWTH Above: At Blackfoot-Clearwater WMA, thick understory, historically kept open by low-intensity fire, blocks sunlight from grasses and forbs on the forest floor. Below: The Ovando Mountain Unit, 1939 and 2005, showing how open elk winter range (light areas) filled in with trees (dark areas) during a half century without wildfire.



MORE AGES ARE BETTER

The first project site is a 128-acre stand of aspen circled by a 100-foot-wide clear-cut. Boccadori explains that Douglas fir and lodgepole pine surrounding the aspen had crowded in, shrinking the grove. The timber harvest set back the expanding conifer growth. The cut trees and disturbed soil also caused aspen to "sucker" (sprout up) from dense root systems. The open perimeter is filled with 3-foot-tall saplings,

enough to withstand the fire, and the crowns rose high enough to escape the flames below. These same fires killed younger understory conifers, allowing sunlight to reach grasses and forbs on the forest floor. By killing small trees creeping into and shading open parklands, the flames also set back the natural process known as forest "succession."

Natural fire regimes that had shaped western forests since the last ice age abruptly ended in the early 1900s. That's when the U.S. Forest Service and other agencies insti-

their potato chip-sized leaves wiggling in the breeze. Boccadori tells me these young aspen are accessible to moose, deer, and ruffed grouse, while midsized trees supply nesting habitat for several bird species. Older aspen benefit other birds; dead standing trees are great for cavity nesters like woodpeckers; and the old, fallen trees provide hiding cover and den sites. "The more age diversity, the better," Boccadori says.

Next we ascend a twisting two-track road to a relatively flat area along a high hill to see



JAY KOLBE/FWP

LET THE SUN SHINE IN A stand of Douglas fir on the Blackfoot-Clearwater WMA reveals the open spaces created when understory is cleared out. Historically, this was the result of low-intensity wildfires, but these days it requires selective cutting. Either way, sunlight can reach shrubs and sedges that deer and elk eat. And the remaining tree crowns can spread and block more snow from the ground, allowing wildlife freer movement in winter.

the second project. Here crews from Sun Mountain Lumber of Deer Lodge removed beetle-killed lodgepole pine on seven sites of various sizes totaling about 200 acres. They left behind thicker, older stands of Douglas fir, which Boccadori says is better security and thermal cover for elk and deer than the spindly lodgepole.

Clear-cutting in the early 1900s produced large stands of densely packed, even-aged second-growth lodgepole pine in much of the forest that eventually became the WMA. The

Tom Dickson is editor of Montana Outdoors.

uniform stands lack the diversity that would provide food and shelter to more game and nongame species. They also invite large-scale infestations of pine-bark beetles, which can easily fly from tree to tree.

Scattered about the project site are stumps of lodgepole felled by a tractorlike machine called a harvester, still parked nearby. "One goal of this project was to clear out dead and dying lodgepole that, over time, would topple and make it hard for big game to move throughout their winter range," Boccadori says. Bunches of dried rough fescue dot the open areas, along with showy aster, Oregon

grape, and patches of alder, snowberry, and huckleberry—all nutritious deer and elk food.

AERIAL EVIDENCE

Last year FWP carried out similar habitat-driven timber harvest projects 50 miles to the north on the Blackfoot-Clearwater WMA. On 345 acres in the WMA's 6,000-acre Ovando Mountain Unit, crews from Pyramid Mountain Lumber thinned the understory below centuries-old conifers. "From aerial photos taken in the 1920s and '30s, we know that these south- and west-facing slopes were historically parklike ponderosa

A SEQUENCE OF EVENTS



Historically, frequent low-intensity fires swept through western Montana forests, clearing underbrush and allowing sunlight to invigorate grasses, forbs, and shrubs eaten by deer, elk, and other wildlife.

Decades of fire suppression allowed understory to build up, degrading wildlife habitat and creating huge fuel loads that lead to catastrophic fires.



Following record warm winters in the 2000s, pine bark beetles thrived. The insects killed hundreds of thousands of acres of mostly lodgepole and ponderosa pine in western Montana, adding to fuel loads.

The combination of dense understory, shrinking aspen stands, and dead lodgepole compelled FWP to begin timber management projects on Mount Haggin and Blackfoot-Clearwater WMAs.



The timber harvest produced multiple benefits for wildlife: grasses and wildflowers eaten by deer and elk flourish in newly opened areas; saplings add age diversity to aspen stands; bitterbrush grows more abundantly in areas open to sunlight; crowns of larger trees expand to

pine, Douglas fir, and larch stands, mixed with extensive shrub fields,” says Jay Kolbe, FWP area wildlife biologist based in Seeley Lake. “I also went out and found older trees with burn scars from past periodic fires. The trees themselves were telling us their history.”

Elsewhere on the unit, says Kolbe, crews rejuvenated aspen stands by removing small conifers creeping in from the periphery.

FWP contracted with licensed foresters to supervise the Mount Haggin and Blackfoot-Clearwater projects to ensure wildlife habitat goals were met. Both projects required environmental assessments, open to public review and comment, that outlined the likely positive and negative effects of timber harvest.

Pyramid Mountain Lumber, whose 150 employees make it the largest employer in Seeley Lake, removed nearly 1.5 million board feet of saleable timber as a by-product of the Blackfoot-Clearwater forest restoration. “That one project provided nearly 5 percent of the material needed to keep our mill running during this last year,” says Gordy Sanders, Pyramid’s resource manager. The project provided 2,800 man-days of work for local loggers, truck drivers, and mill workers.

From the roughly 300 acres logged at Mount Haggin, Sun Mountain Lumber harvested and purchased 12,000 tons of saw logs, 384 tons of firewood, 82 tons of house logs, and 20 tons of post poles were commercially sold.

According to Boccadori, it would have cost FWP roughly \$30,000 to improve forest wildlife habitat at the WMA to the extent done under the project. “Basically we got

\$30,000 of wildlife habitat improvement done for free, not to mention the economic benefits to local communities,” she says. In addition to the boost to Sun Mountain Lumber’s bottom line, FWP contracted with a local firewood supplier, who cuts small logs from piles of slash (leftover woody debris) and hires developmentally disabled workers through the AWARE Program to bundle the kindling, which is sold to campers at convenience stores.

Generating a range of benefits was one reason the Montana legislature gave WMA forest management a big boost in 2009, says Ken McDonald, FWP Wildlife Bureau chief. Previously, revenue generated by timber harvest on WMAs couldn’t be used to benefit those lands. Thanks to legislative action, the money now goes into FWP’s new Forest Management Account. The department can reinvest those funds into WMAs where forest management is needed, especially work that wouldn’t generate income and pay for itself. An example is a proposed project on the Blackfoot-Clearwater WMA to cut small ponderosa pines encroaching on grasslands that provide critical elk winter range. In 2011, lawmakers also provided FWP funding and direction to inventory its forest habitats. “Both [the account and the inventory] are great tools that are helping us do essential wildlife management work,” says McDonald.

SO MANY BENEFITS

At Mount Haggin, Boccadori and I drive downhill to a vast, open parkland. There she

“I also went out and found older trees with burn scars from past periodic fires. The trees themselves were telling us their history.”

shows me where Douglas fir saplings had spread into open areas, shading out low-growing bitterbrush. “Mule deer love this plant,” she says. The protein-packed leaves stay on the shrubs until late fall and early winter, when other food is scarce. At this third project site, FWP staff and volunteers with the Mule Deer Foundation removed young firs so sunlight could reach the shrubs and rough fescue, a deer and elk favorite.

From there we drive to the site of a proposed timber cut on the west side of the WMA, an area covered in dense stands of gray- and rust-colored lodgepole. The dead and dying pines are scheduled for harvest along 5 miles of access roads, 8 miles of cross-country ski trails, and portions of 800 additional acres. The goal is to remove dead trees from travel routes—less to prevent the unlikely (though not impossible) event of a tree falling on someone than to keep pines from toppling across the roads during high winds and trapping hunters or others after driving or skiing in.



block more snow from the ground, allowing wildlife freer movement in winter.

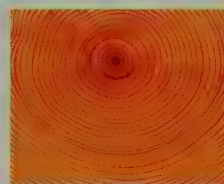
Also, the **risk of catastrophic wildfire has been reduced** as fuel loads diminished. This greatly lessened the odds of fires wiping out big game winter cover and spreading to adjacent private lands.

In addition to reinvigorating wildlife habitat, the projects sustained local logging and sawmill jobs, giving rural economies a shot in the arm. **Blackfoot-Clearwater Project:** 1.5 million board feet, 2,800 man-days; **Mount Haggin Project:** 12,000 tons of saw logs, 384 tons of firewood, 82 tons of house logs, and 20 tons of post poles.



At Mount Haggin, FWP contracted with a **local firewood supplier**, who cut wood from slash piles and hired developmentally disabled adults with the AWARE Program to bundle the kindling, sold to campers at convenience stores.

Also at Mount Haggin, slash from one proposed project will be put in eroded gullies to **reduce silt washing into tributaries of the Big Hole**, the only river holding a sizeable population of arctic grayling in the lower 48 states.



Future timber management projects are slated for Mount Haggin, Blackfoot-Clearwater, and West Kootenai WMAs. More will be proposed for other western Montana wildlife areas where forest conditions have stagnated.

Expenses for the project—including grading two teeth-rattling access roads—will likely be fully met by the sale of timber. The project might even generate surplus revenue that would pay for future Mount Haggin forest management projects. An added benefit, Boccadori says, is that slash will be placed into deep gullies to reduce erosion. With each rain and snowmelt, the hillsides currently bleed silt (which covers and suffocates fish eggs) into tributaries that eventually send water into the Big Hole River, 15 miles to the south.

Reducing the risk of catastrophic wildfire is another benefit of some prescribed timber harvest, says FWP wildlife biologist Tim Thier, who is managing a project proposed for the West Kootenai WMA near Eureka. He says decades of stagnated conditions have allowed small trees to choke the spaces between larger old growth. “If we don’t take action, we could see this entire area burn with a high-intensity fire that would endanger nearby homes,” Thier says. “The fire could also be severe enough that deer and elk would lose a major source of cover during deep snow.”



REJUVENATED Vanna Boccadori, FWP wildlife biologist in Butte, with new quaking aspen sprouting from a small clear-cut on Mount Haggin WMA. “Depending on the wildlife, certain tree and shrub species and ages are better than others,” she says.

Despite what it sees as obvious benefits, FWP recognizes public concerns about opening up WMAs to even limited timber harvest (see sidebar, below). That’s one reason the department ensured the projects on Mount Haggin and Blackfoot-Clearwater WMAs were based on science and achieved clear wildlife management objectives. In 2010, University of Montana (UM) researchers documented the need to thin

says. “The conifer removal eliminated habitat for red squirrels, and squirrels eat bird eggs and prey on hatchlings.”

JUST WHAT TYPE OF DISTURBANCE?

There’s no getting around the fact that trees keep growing, and growing. As a result, it appears that FWP must continue managing forests on WMAs. “It’s essential,” says McDonald. “We’re losing thousands of acres

some forests on the Blackfoot-Clearwater WMA where succession had degraded elk and deer winter range. On Mount Haggin, FWP crews conducted surveys of plant communities and small mammal occurrence in the bitterbrush and aspen areas before and after encroaching conifers were felled. The department also invited UM researchers to study bird nesting success in Mount Haggin aspen stands before and after logging. “Preliminary results are that nest success is up,” Boccadori

There’s no denying that timber harvest can harm wildlife habitat.



Though timber harvest means fewer dead trees for cavity-nesting birds like the hairy woodpecker, the loss pales compared to the millions of beetle-killed pines still remaining across western Montana.

Commercial forestry practices often produce large, artificially homogenous stands. Tractors, trucks, and other heavy equipment compact soil and spread noxious weeds. Unless closed or restored to natural conditions after use, the roads necessary for timber management can harm species such as elk and grizzly bears that shun motorized vehicles.

“We realize we’re stepping into some potentially sensitive territory by doing forest management activities on wildlife management areas (WMAs),” says Ken McDonald, FWP Wildlife Bureau chief. “But we’re confident that as long as our biologists and good science are driving the management plans, the wildlife benefits from these relatively small, prescribed operations will far outweigh the detriments.”

Among the public concerns voiced in public meetings and environmental assessment comments:

► **Harm to other species:** “Any habitat management project will benefit some species at the expense of others,” says Jay Kolbe, FWP wildlife biologist in Seeley Lake. “Although we consider the full range of native species in our management decisions, FWP bought this WMA in 1957 specifically to benefit deer and elk. They remain our primary focus.”

► **New roads reducing security for elk and other big game:** Vanna Boccadori, FWP wildlife biologist in Butte, notes that existing closed roads were opened only during the projects. New temporary roads were restored to preexisting conditions after the work was done.

► **Loss of winter thermal and hiding cover:** “We didn’t manage forests on north- and east-facing slopes, where historically



NEW GROWTH Areas open to sunlight after timber harvest are especially beneficial to moose, young and old. The large ungulates browse “early successional” vegetation such as willow, aspen, serviceberry, alder, and other shrubs, and also graze forbs like sticky geranium and lupine.

of prime winter range just from conifer encroachment.” In addition to aging and overgrown stands at Mount Haggin and Blackfoot-Clearwater, forests on the new 24,000-acre Marshall Block and 41,000-acre Fish Creek WMAs need attention. “Now that we’ve acquired these landscape-scale areas, it’s our responsibility to actively man-

age them to benefit wildlife,” McDonald says.

Not everyone is comfortable with the term “actively manage.” Some Montanans want to put “Do Not Disturb” signs around all forests. For certain timbered areas, that may make sense. But for others, a total hands-off approach is unnatural. Forests are dynamic and require periodic disturbance.

What type of disturbance is the big question. “We want to create sustainable wildlife habitat that looks and acts as if periodic wildfires were still allowed to play their historical role,” says Kolbe.

That’s an approach to forest management on WMAs that no one should lose any sleep over. 🐻

fires were rare,” says Kolbe. “Those wetter areas still have the dense vegetation that deer and elk use in winter to escape predators and stay warm. We also retained patches of thick cover within thinned stands along draws to provide security cover.”

► **Soil compaction from heavy equipment:** Much of the work was done in winter, when snowpack protected soil from tractors, trucks, and harvesters, McDonald says.

► **Biomass and nutrient loss:** “We retained lots of slash and woody debris on the forest floor to provide nutrients to the soil,” says Kolbe. No logging was done near streams, so that fallen trees can continue to add nutrients to aquatic ecosystems, and also to prevent damage to riparian areas.

► **Loss of dead trees for cavity nesting and roosting:** Large trees left on the project

sites will eventually die and become snags. And both WMAs are still filled with thousands of acres of beetle-killed lodgepole pine, much of it big enough to provide cavity habitat and raptor roosting sites.

► **Spread of noxious weeds:** McDonald says FWP policy requires that potentially weed-spreading logging vehicles must be power-washed to remove seeds before entry to WMAs. Soils disturbed by heavy equipment—and therefore made more vulnerable to the spread of weeds—must be re-seeded with native plants. Logged areas must be treated with chemical, hand-pulling, or bio-control methods of weed control before the projects and up to five years after.

► **The “slippery slope”:** The biggest public concern is that future WMA timber harvest will expand into large-scale clear-cutting. Also

worrisome is that some lawmakers could begin thinking of WMAs primarily as income sources for local wood products industries.

Acknowledging the validity of these concerns, McDonald points out that every proposed project will continue to undergo rigorous review by FWP managers and the public. “Our department has a mandate to manage wildlife,” he says. “That’s the primary reason we will do these projects. We are not a commercial timber operation. We purchased these areas, primarily with hunter license dollars, as wildlife habitat, not to generate income from forests. Yes, our timber harvest can benefit local economies. But it would be irresponsible of us not to make sure that any logging that takes place on WMAs isn’t targeted at achieving specific wildlife management objectives.” ■



WHY I HUNT

BY TODD TANNER

PAINTINGS BY THOMAS AQUINAS DALY

“Why do I hunt? Well, I hunt because....”
Yeah, right. As if there’s an acceptable answer to that question, one I can regurgitate to nonhunters at Christmas parties and still offer with a straight face to my fellow sportsmen, people who already know in their hearts and guts and bones that we hunt for the same reasons we breathe. Because we don’t have a choice.

Just as some human beings are born with the gift of artistic talent and others have an innate facility with numbers, we hunters seem blessed with a genetic predisposition toward the chase. It’s who and what we are, not so much on a personal level—that actually comes out when we ask ourselves, “Am I a deer hunter, or a bird hunter, or an elk hunter?” or “Do I hunt with a rifle or a bow or a shotgun?”—but rather on a cellular level, even a spiritual level.

In other words, we hunt because we have a visceral connection to the land, one we simply can’t ignore. A connection, I might add, that stands in stark contrast to the social and cultural insanity that surrounds us.

For how else can you describe a world where so many bright, talented people sit passively in front of their television sets and computer screens while their real lives slip by, a society where Madison Avenue advertisers set the agendas and the folks we see day in and day out—our friends and families and coworkers and neighbors—are defined by the Powers-That-Be as...that’s right, say it with me...

“Consumers.”

Forgive me for being blunt, but what a horrid, de-meaning title. And the fact that so many of us accept this label without taking offense shows that we’ve broken our sacred bond with the natural world.

Even worse, we’ve turned toward the bright, beguiling,

vacuous lights of a culture that no longer revels in the changing of the seasons or the richness of the earth, a culture bereft of the steadying influence of heritage and tradition. In this new reality, where food comes in sterile plastic packages and important concepts like “meaning” and “purpose” grow ever more elusive, far too many Americans are left to hope that each new distraction (or each new purchase) will fill the void they feel in their hearts.

Yet as hunters, lashed to the bedrock of our outdoor legacy and holding tight to the ancestral knowledge that flows through our veins, we retain a clarity that’s increasingly rare in the modern world. We see through society’s shallow trappings and we know, if

Did you think
I was kidding
when I wrote that
hunting was a
genetic imperative,
or that most
hunters don’t really
have a choice?

not consciously then intuitively, that our time afield is a direct conduit to sanity and balance and tradition, a lifeline running back 10,000 years to an era when humanity could still tell the difference between reality and illusion.

You could even say that our connection to the land lends a special clarity to the rest of our lives. Our relationships with families and friends, our passion for nature, our understanding of how life works and where we fit into the grand scheme of things, our role as stewards and caretakers—all these truly important aspects of our existence are influenced by the fact that we are hunters. We have a purpose, and it’s not simply to multiply and consume.

Which doesn’t necessarily mean that all the other answers to our original question—we hunt because we love the outdoors, or because we love to eat wild meat and fowl, or because we love the excitement and the challenge—are wrong. They’re not. But in and of themselves, they’re incomplete. They’re the ripples on the pond obscuring the quiet depths below.

Here’s something you might not have heard before. Thom Hartmann, whose brilliant book *The Last Hours of Ancient Sunlight* offers tremendous insight into why modern societies can’t seem to live in a responsible, sustainable manner, has also developed what he calls the “Hunter in a Farmer’s World” hypothesis.

Hartmann suggests that the social dysfunctions we call Attention Deficit Disorder and Attention Deficit Hyperactivity Disorder (ADD/ADHD) can be traced back to our innate predatory nature. When those of us who are genetically wired as hunters are forced to adapt to a sedentary, risk-averse lifestyle, traits and behaviors that were once vital for our survival suddenly become unnecessary, even problematic.

As Hartmann notes, “Genetic scientists now suggest that ADHD is not a disease, pathology, defect, or disorder. Instead, ADHD is a genetic difference that would ideally suit a person to life in a hunting/gathering world, while those without the ADHD trait are better suited to a life of cautious, methodical agriculture.”

Did you think I was kidding when I wrote that hunting was a genetic imperative, or that most hunters don’t really have a choice? Or, if we do have a choice, that it’s between recognizing and accepting our rightful place in the world and succumbing to the pervasive illusion that humanity can exist apart from nature?

Just in case there’s any doubt in your mind, we can’t afford that particular fantasy. Not anymore. If we’re going to have any chance at all of saving our planet from threats like unchecked development, global warming, and increasingly toxic pollution, we have to acknowledge the most basic of facts. The way we treat the land is the way we treat ourselves. There is no separation. There can’t be. It’s simply not possible.

Sometimes I wake in the morning to the buzz of my alarm clock, and as I lie there in bed, chained down by the warmth of my blankets and the absolute certainty that it’s cold, dark, and nasty outside, I decide that I’m not going to get up. Not today. I’m not going to dress in the predawn blackness, I’m not going to spend another day in the rain and snow and wind, I’m not going to walk until my feet hurt and my knees throb and my back aches, all for the sake of a whitetail buck I probably won’t see or a bull elk who knows better than to bugle within 5 miles of a dirt road.

Sleep beckons, pulling me back into my dreams, back to a place of comfort and serenity, and it’s so easy to justify my decision, to snuggle up to my wife and slide that gentle slope into tranquility, that I wonder how I’ve ever done it before; how I’ve managed to rise and dress and slip out of the house on a thousand other mornings.

Then I remember something. It’s not especially profound or insightful—unfortunately, I’m not the kind of person who has regular moments of inspiration—but it’s important nonetheless. I remember that I’m a hunter. I am a hunter. And with that simple realization my perception changes, as do my priorities, and I can climb from

Todd Tanner, a lifelong sportsman and former fishing and big game hunting guide, is an outdoor writer and the chairman of Conservation Hawks, a nonprofit hunting and angling organization. He lives in Bigfork. This award-winning essay originally appeared in Sporting Classics magazine, where Tanner is a senior editor and columnist. New England landscape and still-life artist Thomas Aquinas Daly’s work has appeared in many gallery and museum exhibitions and several book collections.





bed while the love of my life dreams on, oblivious to the ancient call coursing through my veins.

Maybe in the end, that's what hunting is really all about. The act of remembering. Remembering that we're part and parcel of the natural world, and that we still have a vital role to play.

In his novel *The Story of B*, author Daniel Quinn makes a strong case that modern cultures have consciously cast aside both the skills and the stories of our ancient hunting and gathering ancestors. He calls this phenomenon, where we treat the first 100,000

years of human existence as if they don't exist, the "Great Forgetting."

The Great Forgetting. What a perfect title.

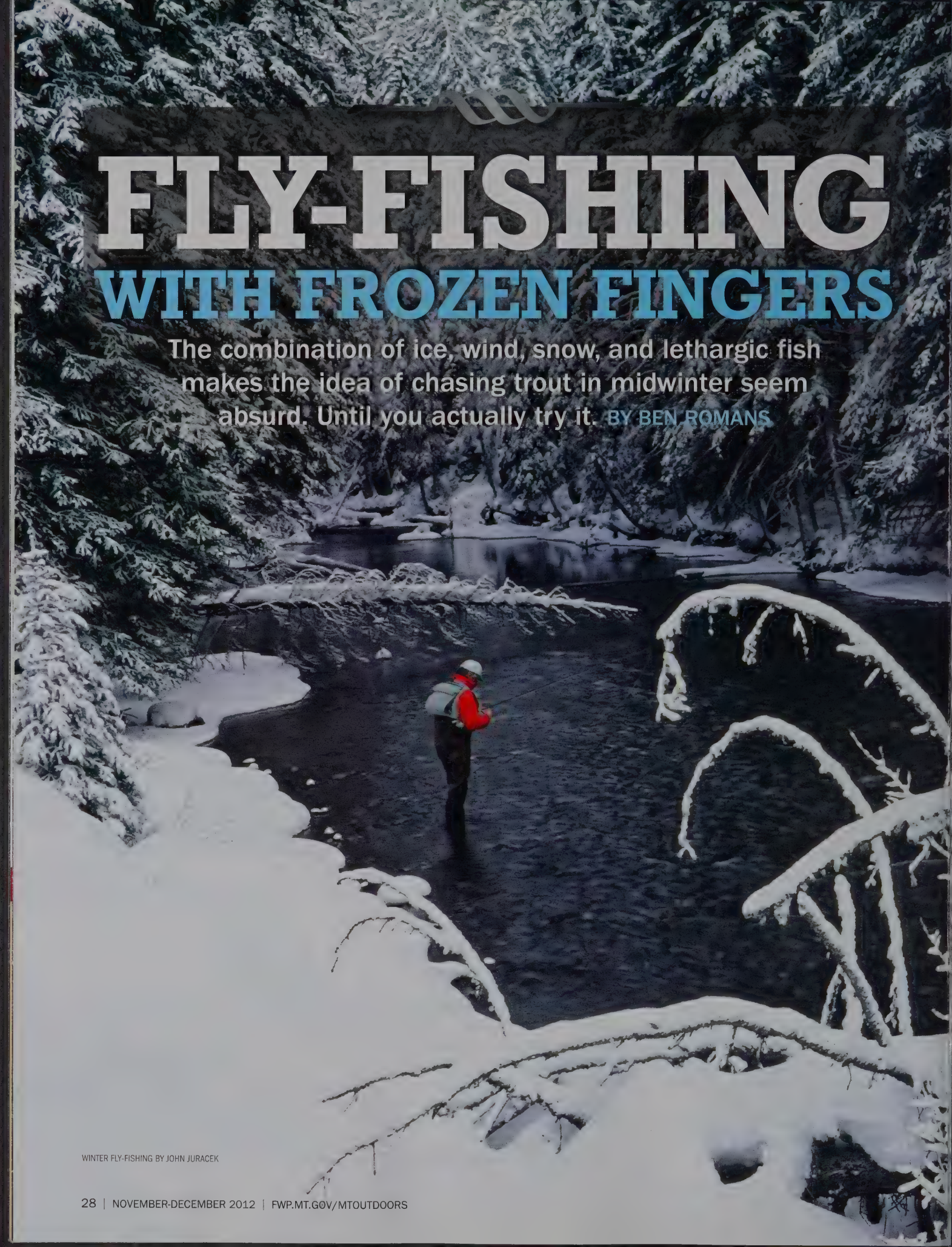
Yet some of us—the true hunters among us—seem able to access at least a portion of that long-lost information. Perhaps we don't know where it comes from; whether it's passed down through the genes we share with our forebears or through some spiritual connection to a younger, more perfect world. But we still feel that awesome bond with the land and with the thousands of generations who walked the earth before us.

So when I head out into the woods in my

wool jacket, my longbow in hand and my cedar shafts nestled in their leather quiver, I hunt with as much passion and honor as I can find within myself. I respect both the animals and the beautiful world in which they live. I give thanks for all the gifts, great and small, that come to us when we immerse ourselves in the outdoors. And I try to do my part as a steward, hopefully leaving the landscape in a little better shape than I found it.

I never ask myself why, though.

I'm a hunter, and that's all I really need to know. 🐾



FLY-FISHING WITH FROZEN FINGERS

The combination of ice, wind, snow, and lethargic fish makes the idea of chasing trout in midwinter seem absurd. Until you actually try it. **BY BEN ROMANS**

WINTER FLY-FISHING BY JOHN JURACEK



Sometimes it seems as though Montana has no fly-fishing secrets remaining, no adventures yet to discover. Most of its big-name rivers are known throughout the world. Stories about many smaller streams and mountain lakes appear in fishing magazines and websites. Even the sometimes fantastic fishing of early spring and fall—insider's knowledge once known only to locals—has become widely known.

What's left for those of us who fish here regularly but still want to discover something new? How about this: Instead of looking for new water, consider fishing familiar streams and rivers at the most unlikely time of year—winter.

I'm already a big fan of winter, so getting me to fish during my favorite season requires little prodding. I especially enjoy the quiet. In addition to the lack of crowds—or even a single other angler, in many cases—the scenery and sounds of winter landscapes are muffled and muted by snow and ice. If you fly-fish at least partly for the serenity, you'll want to learn how to do it during the cold months.

In winter, I want to be outside. Fiddling at my fly-tying bench staves off cabin fever for only so long. So I bundle up and head to my favorite river—if only for an hour or two. And even though peace and solitude are the main reasons I'm out there, I figure that as long as I'm fishing, I might as well catch a few fish.

Think warmth

Unfortunately, winter is not the best time to attract trout to a fly. The icy water slows the cold-blooded creatures' metabolism, making them lethargic. Trout move less than in summer and aren't as hungry.

Still, they can be caught. The key is knowing when to go.

The main thing to remember is that the warmer, the better. If the forecast is for daytime temperatures to drop below freezing, consider staying indoors until things warm up. Fish can be caught on cold days, but it's a lot harder than during sunny winter

afternoons with temperatures in the upper 30s or higher. Warmer air and water mean more active aquatic insect activity, which, in turn, persuades fish to feed. What's more, you can stay outdoors and fish longer in the more comfortable conditions.

To squeeze the most warmth out of a day, fish rivers or long portions of rivers that have the most sunshine hitting the water. The winter sun follows a southeastern-to-southwestern arc, warming primarily what gets hit by the rays. Rivers running north or south

have more sunshine on the water during daytime than those flowing east or west.

Both the Madison and Bitterroot Rivers flow northward with virtually no topography blocking the sun. They warm more quickly and stay warmer than, for example, the lower Blackfoot River. Flowing west and flanked by mountains and canyons, the lower Blackfoot receives virtually no sunshine in December and January. It's also one of the last to wake from its winter slumber in spring.

The Missouri has examples of both.

Some portions below Craig run north for a mile or more, soaking up sunshine the entire way. Then the river suddenly cuts into a deep, dark canyon and the air temperature drops 20 degrees. That's no place to spend a Sunday afternoon in January.

Tailwater trout

Another way to find warmer water is to fish tailwater fisheries, which are like gigantic spring creeks. The upstream reservoir provides the water source, which remains relatively constant through the year. As a result, ever-changing weather fronts don't alter a trout's daily routine downstream from dams nearly as much as on rivers without tailwater fisheries.

The state's two top tailwaters are the Missouri below Holter Dam and the Bighorn below



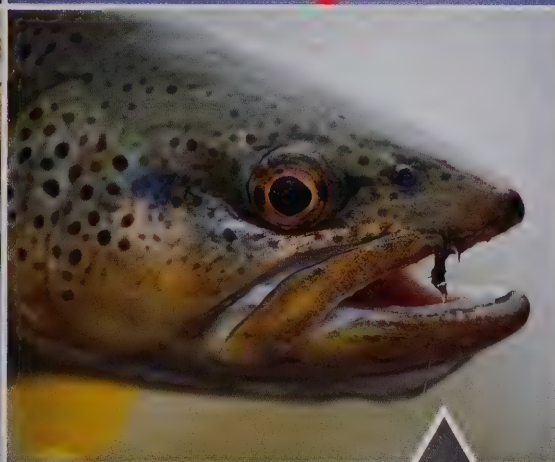
WHATEVER IT TAKES As snowpack increases, just reaching trout water can be the biggest challenge. Snowshoes will help, but usually all that's required is high-stepping through a few yards of deep snow.

Yellowtail Dam. On both, water temperatures drop no lower than the upper 30s through January, February, and March. "The water will cool a little a few miles after it leaves the dam, but I've only seen the river get shelf ice as far down as the Bighorn [Fishing Access Site], about 12 miles downstream," says Duane Schreiner, owner of Bighorn Fly and Tackle in Fort Smith. "Fishing can be spectacular even at 10 and 20 below zero, but we generally try to convince people to fish when the air is at or above 30 degrees. Anything below that and you spend too much time keeping ice from freezing up your gear. The fish don't quit hitting; it just becomes more bother than it's worth."

Another great tailwater is the Madison River from Hebgen Dam downstream to Quake Lake. Just 2 miles long, the stretch doesn't hold a huge amount of fishable water. But because it's so far from anything—the closest town, 20 minutes away, is sparsely populated West Yellowstone—you'll likely have the river to yourself.

A different option is to fish a spring creek, where subterranean inputs keep the water at a constant 45 to 60 degrees F year-round. Though most spring creeks are closed to fishing from December 1 through the third Saturday in May, Armstrong, DuPuy, and Nelson Creeks, in the lower Paradise Valley of the Yellowstone River, remain open. These waters run completely through private property and cost users \$40 per day during winter months. Fee fishing may seem blasphemous in Montana, where open public stream and river access is gospel. But in midwinter, with few other options, paying to catch 18-inch rainbows on size-20 midge imitations doesn't seem like the worst way to spend your money.

Another option—this one free of charge—is Poindexter Slough, a spring creek on mostly public land just outside Dillon.



A DIFFERENT SORT OF "FUN" Winter fly-fishing can be downright miserable. Counterclockwise from top right: Rod guides regularly ice up; flies become too frigid to hold; and ice builds up on wading boot bottoms to the point where walking becomes treacherous. The payoff from all this misery comes when you hook a nice fish on a sunny day and think about how much more fun it is than watching TV.

Whether it's a spring creek, a tailwater, or just a regular trout river on a sunny day, don't fish too early. This isn't August, when trout go into a stupor by noon. In winter you want to fish during the heat of the day, when a trout's metabolism increases as the water temperature rises, even if only by a few degrees. Sleep in, have another cup of coffee, do some chores, and maybe eat an early lunch. Then fish when the sun is highest and temperatures climb—typically between 11 a.m. and when the sun's rays no longer hit the water.

Go deep, then deeper

As river temperatures drop and winter flows settle to the lowest of the year, most trout congregate in deep pools and runs. Fish slip

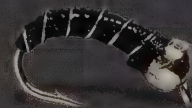
10 top winter flies

With the exception of the Woolly Buzzer streamer, the Griffith's Gnat midge-imitating dry, and Glo Bug egg pattern, all the flies here are nymphs. Winter fishing usually takes place below the water surface.

- ▶ Pat's Rubber Legs
- ▶ Beadhead Prince Nymph
- ▶ Beadhead Pheasant Tail Nymph
- ▶ Copper John
- ▶ San Juan Worm
- ▶ Glo Bug
- ▶ Zebra Midge
- ▶ Griffith's Gnat
- ▶ Woolly Buzzer
- ▶ Ray Charles Scud



COPPER JOHN



ZEBRA MIDGE

under cavernous undercut banks, beneath logjams, and into any long, profound, gravel-strewn trench with slow flows. Trout survive winter by conserving calories. Fish for them in holding waters where they can find safety from predators and feed without expending too much valuable energy.

Winter trout also seek spots where natural springs or adjacent sloughs send in water warmer than the icy river. "Think about summer, when you were wading or walking down the bank, and you suddenly felt a rush of cooler water around your feet and legs," says Jim Cox, co-owner of Kingfisher Fly Shop in Missoula. "That's natural spring water seeping into the system. In the cold months of winter, that turns into a warmer spot where fish gravitate."

After finding likely holding water, you need to get your presentation to the fish. Cox recommends using two-fly nymph rigs. By mimicking two different food sources, you double your chance of getting a strike. For example, a Beadhead Pheasant Tail nymph might not interest a trout, but the buggy-looking Pat's Rubber Legs tied on 12 inches away might look tasty enough to eat.

Two-fly rigs also allow you to cover different water levels. A heavy nymph at the end of the tippet helps pull a lighter nymph like a scud imitation or Copper John tied a foot or so up the tippet down toward the bottom. The big fly works like a split shot, except, unlike the lead sinker, it can also catch fish. The heavier fly will drop down into deeper pockets or slots, too.

Strike indicators are essential. They let you know if your fly is bouncing along the streambed bottom, where trout spend most of their time. If the indicator twitches and vibrates during a drift, you know your flies are moving among subsurface rocks. If the indicator just floats smoothly, the flies are too high in the water column, where trout rarely swim. Adding a split shot to your tippet gets the flies deeper.

The most important value of the indicator is to let you know when a fish takes your fly. Trout strike lightly in winter, sometimes biting then spitting out an artificial nymph in less than a second. Without an indicator—

Ben Romans is the author of Montana's Best Fly-Fishing. He lives in Boise, Idaho.

Don't die out there

The combination of moving water, slippery surfaces, and icy temperatures is dangerous. Hypothermia is the biggest risk, but drowning is right up there, too. Tips for making sure you survive your winter fly-fishing adventures:

- ▶ Always tell someone where you're going and when you expect to return. Offer as many details as possible.
- ▶ Prepare for the worst. Bring backup clothes and a fire-starting kit in case you take a spill or your waders leak.
- ▶ Dress much, much more warmly than you think you should. Even on sunny, relatively warm days, you will cool down fast when standing near and especially in a river—despite neoprene waders. Wear heavy fleece pants and jackets and avoid jeans and other cotton pants or undergarments. Cotton absorbs moisture and won't insulate when wet. Combine a breathable raincoat over a down vest or jacket. A heavy wool or fleece cap is also a good idea.
- ▶ Keeping your fingers warm is the biggest challenge. Use thick fleece



FIRE UP Bring matches and a fire-starting kit so you can build a body-warming blaze if you get wet or chilled.

fingerless gloves with mitten tops you can pull over your exposed digits when you don't need dexterity. Yes, you can cast and reel line with mittens.

- ▶ Use a wading staff. Even if you never consider one in summer, a staff is vital in winter, when boulders ice up and banks are especially slippery. Remember, in winter a slip and fall into icy water can spell disaster.
- ▶ Bring a thermos of hot coffee, tea, or hot chocolate. After a few hours in the cold, it's easier to warm up from the inside out than from the outside in.

and by not striking whenever you see it pause for a moment or move in a direction not in line with the current flow—you can easily miss a take.

When to go on top

Aquatic insect hatches are much less common in winter than during other times of the year. The water is usually too chilly for the cold-blooded bugs to undergo metamorphosis. But hatches occur. The most likely flying or floating insects you'll see are blue-winged olives, small stoneflies, and, especially, mosquito-sized midges.

Craig Mathews, owner of Blue Ribbon Flies in West Yellowstone, approaches

midge dry-fly fishing with the same respect he gives to fishing caddis and mayflies in summer. "Midge fishing is always best on a warm, overcast day, because you don't have shadows to contend with," says Mathews, who fishes at least two days a week, even in winter. He explains that if your fly rod or fly line throws a shadow over a rising trout, the fish will spook and stop feeding. "But if it's a little overcast, you can get away with a little more," Mathews says.

"The beauty of winter midge fishing," Mathews adds, "is the fish lock into narrow feeding lanes, so if you crouch low as you walk you can get close. Then I kneel down or sit. I like to see the fish's eyeballs—I get that

Is this river or stream open to fishing?

Before setting foot in any water during the winter months, check Montana's fishing regulations. While most major rivers remain open to fishing year-round, many tributary streams are closed from December 1 until the third Saturday in May.

Trout harvested from winter's cold water taste better than at any other time of the year. If you decide to release your catch, keep it submerged at all times to prevent stress from the frigid air temperature.

absorbing powder like Frog's Fanny to keep the imitation buoyant. "Floatant just mats down the fibers of a small, sparse midge dry," he says.

One challenge is to keep track of your imitation fly among the thousands of naturals floating on the surface around it. If you lose sight of your fly, don't despair. "Quite often the adult midge naturals will cling to your leader, so if you don't see your fly and a trout takes it, you still might see a long line of naturals on the water sort of jerk forward," Mathews says. "It's kind of like bobber fishing with a natural, live bobber."

Mathews recommends midge patterns with trailing shucks. "From what I've seen, fish feeding on midges mostly take impaired adults, cripples, and stillborns," he says.

Other than that, go with the simplest patterns, such as a Zelon Midge. "That's important," Mathews says. "Fish tend to ignore complex midge pupae and adult patterns and just want something simple."

Keeping at least a few aspects of winter fly-fishing uncomplicated is a good idea. Fishing during the cold months is definitely more difficult and cumbersome than in summer. It requires more clothing, more patience, and, considering the ever-present risk of hypothermia, far more attention to safety (see sidebar on page 32). But for some of us, the bother is worthwhile. The crowds are gone, and you're outside in a river with a fly rod in hand.

Besides, if nothing else, fly-fishing during a few chilly days in midwinter makes you appreciate a sunny summer afternoon on the water all that much more. 🐟

close. Then I make short casts and presentations, almost simply dapping the fly. I just use a little fly line and my leader out of the rod tip."

Mathews says this technique is ideally suited for a tenkara rod. Tenkara is a traditional Japanese style of fly-fishing growing more popular throughout the United States. A tenkara angler uses only a slender 12- to 15-foot rod and a fixed length of line tied to the end—no reels or rod guides. It's a lot like the cane pole fishing of old but with a high-tech telescopic carbon rod.

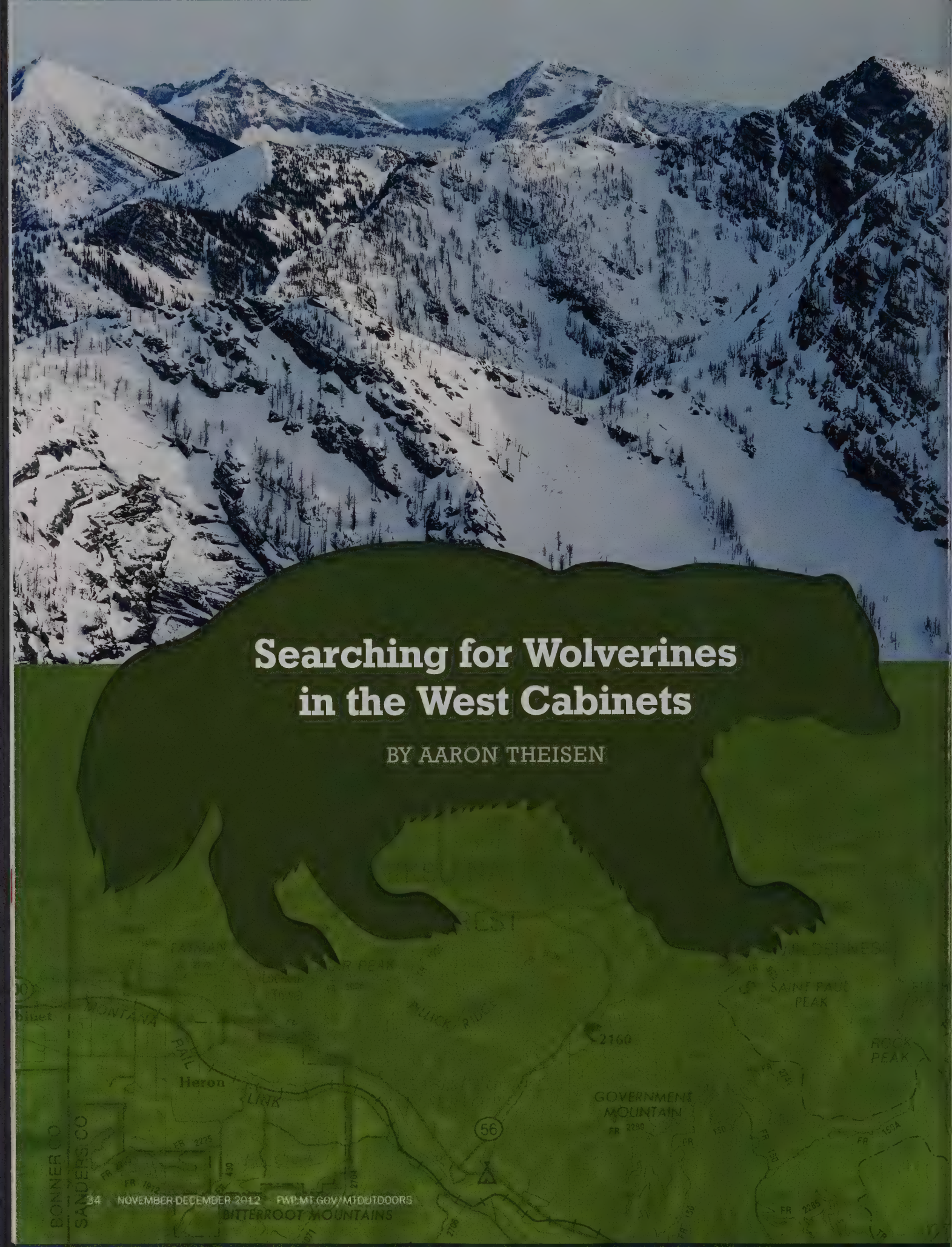
"Tenkara is perfect for winter midge fishing," Mathews says. "I've fished as cold as 22 below zero on the Madison, and that's

where something like tenkara techniques and equipment come in handy. You're fishing a short, fixed-length cast, and you don't have to worry about your reel or guides freezing up."

Mathews says most midge action is in soft water along banks and fringes of fast-water chutes. "Find a place where fish are comfortable rising, near relatively calm, moderately deep water, and spend the afternoon there. In my experience on the Madison, fish prefer water closer to the bank, in protected areas, where they don't have to expend too much energy."

Mathews puts floatant on his leader to keep it on the surface but uses a water-





Searching for Wolverines in the West Cabinets

BY AARON THEISEN

Last winter, nearly 150 volunteers spent 2,000 hours trying to capture images of the elusive furbearer with trail cameras in a remote wildlands area along the Montana-Idaho border.



OF NORTH AMERICA'S many reclusive wildlife species, the wolverine is among the hardest to find. The aggressive carnivore can be equally ferocious as a wounded grizzly bear and can kill a full-grown elk. Yet its reputation as a take-no-prisoners predator belies the wolverine's secretive side. These animals do not want to be found. And because they are so difficult to locate and study, less is known about wolverines than any other furbearer.

In recent years *Gulo gulo* (Latin for "glutton") has, with reluctance, entered the spotlight, thanks in large part to the success of the Glacier Wolverine Project. In that study, researchers identified nearly two dozen wolverines within Glacier National Park, where the covert carnivores were once thought to be extirpated (locally extinct). Since then, researchers have begun casting a wider net. Because it contains all the habitat components wolverines require, one attractive location for conducting a search is the Cabinet Mountains (known in Montana as the "West Cabinets"), straddling the Idaho-Montana border.

"Partly because it's such a wet environment, and partly because it's so remote, the West Cabinets are rich in both plant and wildlife species," says Jerry Brown, a recently retired Montana Fish, Wildlife & Parks wildlife biologist in the Libby area. Brown, who has traveled much of the West Cabinets on foot looking for evidence of wolverines, says the mountains are packed with deep snow in winter, a feature important to the carnivore. "Some parts register more snow than anyplace else in Montana," he says.

The centerpiece of the West Cabinets is

the Scotchman Peaks proposed wilderness area. Looming over the Cabinet Gorge of the Clark Fork River, the Scotchman Peaks area encompasses 88,000 acres of rocky summits, subalpine meadows, and steep, brushy drainages. No roads enter the Scotchmans, and only a few footpaths penetrate the periphery—in short, ideal living conditions for creatures that shun humans.

Last winter, in collaboration with volunteers led by the Friends of Scotchman Peaks Wilderness (FSPW) conservation group,



and with funding from Zoo Boise, the Idaho Department of Fish and Game (IDFG) installed and monitored dozens of bait stations with infrared cameras throughout the West Cabinets in the hopes of documenting wolverine presence. The study was part of Idaho's Multi-Species Baseline Initiative, a project to establish population numbers for a wide range of wildlife species.

"In 2000, some folks in Congress got together and decided that we needed an early warning system to determine which species

were in danger of becoming endangered down the road," says Michael Lucid, IDFG regional wildlife biologist. "Congressional leaders created the State Wildlife Grant Program with the intent of allowing every U.S. state and territory to plan and carry out proactive conservation actions to prevent fish and wildlife from becoming endangered."

The wolverine is a species "of greatest conservation need" in Washington and Idaho. But is the species actually in danger of disappearing from those states? No one knows. That's one reason researchers started looking in the West Cabinets during the winter of 2011-12. "Whether you're of the opinion that wolverines need more federal protection or of the opinion that we need to keep the species from being listed under the ESA, you can appreciate that we need more information," says Lucid. "If we have no data, we can't make defensible management decisions."

For decades the West Cabinets have essentially been "a 'no info' zone," says Kelsey Brasseur, FSPW wolverine project coordinator. "Our study was a fact-finding mission to solve that problem."

ADOPT A BAIT STATION

Searching for animals that don't want to be found takes enormous manpower, which IDFG lacked. So Brasseur recruited nearly 150 volunteers, including individuals, families, church groups, and others. The volunteers signed up to "adopt" bait stations, where remote sensor cameras were set up to record visiting wildlife.

From each bait tree, volunteers hung a beaver carcass—obtained from trappers—or part of a road-killed deer. Brass-bristle brushes were installed under the bait to snag hair samples from curious carnivores. Hair samples were later analyzed by a lab to verify species identity. On an adjacent tree, volunteers attached a motion- and heat-activated infrared camera. Anything that was warm

Aaron Theisen is a freelance writer in Spokane, Washington.

“Each time we checked a camera’s file, we sort of held our breath, wondering what we’d see.”

and moving triggered the shutter.

The environment of deep snowpack, steep drainages, and avalanche-prone cirques that attracts wolverines unfortunately also inhibits wolverine research. “[*The Wolverine Way* author] Doug Chadwick writes that ‘studying wolverines doesn’t come at anyone’s convenience,’” says Lucid. “In northern Idaho, it can be 20 degrees below zero out or it can be raining—all in the same day. In addition, in winter you’re dealing with really short days. You’ve got less than eight hours to get it done in daylight, so a lot of the time the volunteers were coming back in the dark.”

That didn’t dissuade the Idaho and Montana volunteers. “We’re fortunate to live in an area that’s rugged and is populated with rugged people,” says Brasseur. “Volunteers were really good at finding ways to get back into these areas.” The Idaho Conservation League and staff of Selkirk Outdoor Leadership and Education helped recruit and train volunteers. Some cross-country skied seven hours or more into the backcountry to reach the most remote bait stations. Then they had to come out again, often using headlamps.

At the end of the winter season, volunteers sorted through nearly 100,000 images

captured by the 36 camera stations. “Each time we checked a camera’s file, we sort of held our breath, wondering what we’d see,” says Brasseur.

Researchers and volunteers were disappointed not to find a single wolverine image. However, the cameras still provided the most complete picture of Scotchman Peaks carnivores to date—including a few surprises. Fishers—until recently thought to be nearly extirpated from their range in northwestern Montana—appear to have established a stronghold in the West Cabinets. The study documented fishers visiting 23 bait stations over the winter. Researchers were also surprised by the inordinate number of northern flying squirrels in the study

area. One picture shows seven flying squirrels simultaneously feasting on a single beaver bait. In addition, the cameras captured pine martens at 41 stations. Other species included ermine: 20 stations; bobcat: 7; coyote: 5; wolf: 4; and red fox: 1.

“With this evidence of carnivore diversity, you go a long way toward establishing with the public that the Scotchman Peaks is truly a special place,” says Brown.

As for the lack of wolverine images, Lucid says that, for now, it appears the area is not home to the large mustelid. “You can never say for sure a species is absent. But the bait station technique is an excellent way to detect wolverines. Not detecting even one with the high sampling intensity we applied to the West Cabinets suggests no resident and reproductive wolverines are in that area.”

Lucid notes that IDFG biologists and others have found wolverine tracks in the West Cabinets, “so we know that wolverines are at least traveling through the area.” Also, wolverines have been recorded by IDFG cameras in the Selkirk Mountains to the north and by a U.S. Forest Service camera in the adjacent Cabinet Mountains Wilderness to the east.

It could just be a matter of time before the elusive carnivores once again call the Scotchman Peaks home. 🐾

LEARN MORE

Idaho Multi-Species Baseline Initiative
<https://fishandgame.idaho.gov/content/baseline>

Wolverines in Montana
fwp.mt.gov/mtoutdoors/HTML/articles/portraits/wolverine.htm

Scotchman Peaks
scotchmanpeaks.org



WHERE'S THE WOLVERINE? Motion-triggered camera stations set up in remote areas of the West Cabinets turned up, from left to right, ermines, fishers, and pine martens, among other carnivores. Though researchers and volunteers found no evidence of wolverines, that doesn't mean the animals aren't there. Wolverine tracks have been spotted, and the reclusive mustelids have been photographed in mountains to the north and east.



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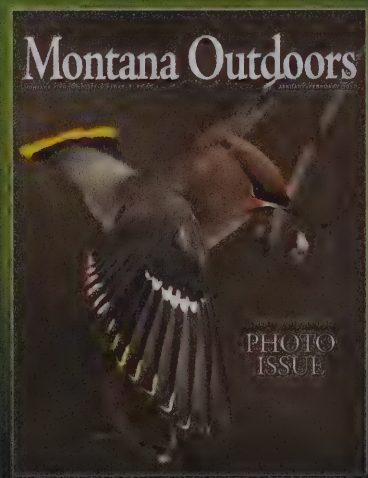
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ER.JENNE

Neither Low nor Close

By Bruce Auchly

It's now elk rifle season, and most hunters want to know where the bull elk are. The quick answer? Up high and way back.

The elk rut, which peaked in most parts of the state around the third week of September, is long over. It was still possible through Halloween or so for a cow to come into estrus, or heat, and be bred by a bull. But in Montana, the vast majority of cow elk are impregnated

from late August through early October.

The elk mating season was a marathon for bulls, and the dominant ones, those that performed much of the breeding, are exhausted, their reserves nearly shot. For weeks on end, a mature bull eats little, living on body fat. Meanwhile, he spends all his time on rutting activities.

That work includes gathering cows into a group, or harem, and then defending them against other bulls. Sometimes fights between bull elk are spectacular, as they lock antlers and shove each other with all their might, much like NFL linemen. It's

exhausting just to watch.

When he's not fighting off challengers, a bull might wallow in mud and urinate on his legs to coat himself with "cologne" to attract more cows. Or he tries to attract cows and intimidate other bulls by bugling and rubbing trees, shrubs, and the ground with his antlers. Then there are all those cows to breed.

Whew, what a lot of work.

As the rut ends, harems disband and cows regroup into larger herds, often joined by young bulls, mostly one- to three-year-olds. Mature bulls either gather in bachelor groups or move off by themselves.

This segregation comes by design, not accident.

Mature bulls, age four and up, lose more fat than young bulls because of the greater stress of fighting off competitors and maintaining a harem. That means they need to find as much nutritious forage as possible after the rut. But they don't want to make themselves vulnerable. One theory for why post-rut mature bulls avoid cows after breeding season is they are exhausted and sense that their antlers mark them as easier prey for predators.

The best spot for a mature bull to recover his strength is not where cow elk gather in the middle of a large, open, grassy hillside, such as those on many FWP wildlife management areas. He's better off on the edge of those wintering ranges, in areas that contain small patches of habitat. Sometimes that includes deep snow that makes it tough for predators to catch him.

The older the bull and the more fat he loses during the rut, the more likely he is to winter alone in remote, hard-to-reach places. Some wildlife biologists suspect that, by shunning cows, the old post-rut bull may end up forgoing the better forage that would keep him alive. By staying at higher elevations in deep snow, he inadvertently makes it that much harder on himself to find nutritious food. Ironically, it's his search for solitude that could end up killing him.

So where are the bull elk this hunting season?

Up high and way back. 🐻

Bruce Auchly manages the FWP's regional Communication and Education Program in Great Falls.

RECOMMENDED READING

BY TOM DICKSON



Bateman New Works

Robert Bateman. Greystone Books, 176 pp. \$55

Wildlife art master Robert Bateman is an equal-opportunity painter. He gives due respect to all animals, from grizzly bears and moose to deer mice and caterpillars. "The great thing about the living world is its complexity," he writes in the forward of this book of new works. "This is what I strive to depict in my art." The Canadian artist travels the world to paint, but many of his works, including most in this new collection, are of animals familiar to Montanans: a white-tailed deer emerging from the woods; Bohemian waxwings on a poplar in winter; a bugling elk on the edge of an aspen grove. To see these familiar species mixed in with paintings of ibex, wildebeest, and snow leopards is a reminder of how a love of wildlife links people throughout the world.

Where Elk Roam:

Conservation and Biopolitics of Our National Elk Herd

Bruce L. Smith. Lyons Press, 272 pp. \$18.95

This important book is ostensibly about the mismanagement of the National Elk Refuge in Jackson Hole, Wyoming. But author Bruce Smith says the underlying message is the threat of disease to wild elk throughout the

Greater Yellowstone Area. Smith, who now lives in Sheridan, Montana, was for 22 years a biologist on the refuge. His primary concern is that wild elk are made increasingly susceptible to disease when winter ranges are artificially overstocked with animals, such as at

Wyoming's feed grounds. The reason for the feed grounds? To reduce competition for grass between elk and cattle. The result? Thousands of elk with brucellosis, which can be transmitted to cattle and bison, causing spontaneous abortions.

An even worse threat, writes Smith, is chronic wasting disease (CWD), which has no cure or preventative. While the prevalence of CWD in free-ranging elk in Wyoming is only 2 to 3 percent, it can exceed 50 percent in captive elk, which transmit it easily to each other in the crowded conditions.

Having fought in Vietnam as a U.S. Marine, Smith is no stranger to combat. And he minces no words when talking to hunters about elk. "When they complain about wolves, I just shake my head," he says. "I tell them, 'You have no idea what the real threats to your elk are.' For some reason, the very real potential of devastating disease outbreaks still isn't on their radar."

Bear Country Behavior

Bill Schneider. Falcon Guides, 104 pp. \$12.95

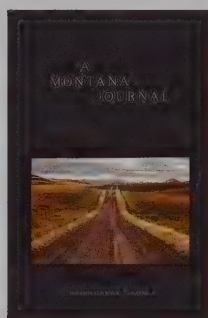
If you own only one guide on how to behave around grizzly

bears, make it this one. Author Bill Schneider, of Helena, is one of the nation's top authorities on camping and hiking in grizzly country. Schneider is a no-nonsense writer who provides essential advice for anglers, hunters, hikers, and anyone else likely to encounter bears. Both the black bear and the brown bear are covered, but Schneider's lifesaving information is most essential for those venturing into grizzly country.

A Montana Journal

Christopher Cauble. Riverbend Publishing, 144 pp. \$24.95

This isn't actually recommended reading. But we thought *Montana Outdoors* readers, of all people, would like knowing about this new journal. It's beautifully packaged in cloth hardcover with a sewn binding and a ribbon marker. Inside are 144 lightly



lined writing pages and 36 color photographs capturing diverse Montana scenes to inspire creative or journalistic entries. This would be a great gift for friends or family members who like to write—or to buy

for yourself to keep track of hunting or fishing trips, backpacking adventures, or other forays around Big Sky Country.

Stalking Trophy Brown Trout:

A Fly-Fisher's Guide To Catching the Biggest Trout of Your Life

John Holt. Lyons Press, 200 pp. \$24.95

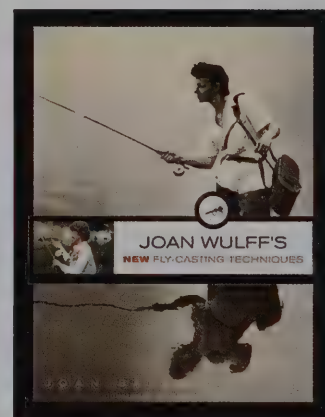
Montana is filled with excellent writers whose subject is often trout angling. But usually the fishing is secondary to themes of self-discovery, marital infidelity, or midlife crisis. Not this book. Though author John Holt is also a

novelist, he excels at writing gritty how-to fishing books like this one. Holt is the real deal. For one thing, he wades wet, stalking big browns in trousers and sandals. No fancy breathable fabrics for him. For another, he does whatever it takes to catch big browns on a fly rod—stripping dace-imitating streamers, dredging Woolly Buggers along deep pool bottoms, casting hoppers into overhanging brush so they drop into the water with a lifelike splash. "I want to connect," writes Holt, "to feel a wild fish as it runs for cover at the bite of the hook or walks and crashes along the surface. The trout's fight for survival makes me feel alive." Like I said, the real deal.

Joan Wulff's New Fly-Casting Techniques

Joan Salvato Wulff. Lyons Press, 224 pp. \$24.95

Joan Salvato Wulff has been writing fly-fishing instruction guides for years, including her ground-breaking *Fly-Casting Accuracy*. With this newly revised and updated version of Wulff's *Fly-Casting Techniques*, she brings her pioneering set of casting "mechanics" to a new audience. Illustrated with helpful drawings, the book includes sections on accuracy, distance, loop control, aerial mending, and correcting common mistakes.

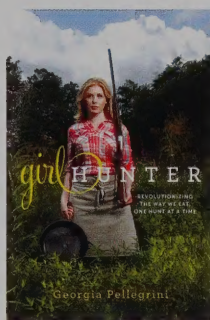


Girl Hunter: Revolutionizing the Way We Eat, One Hunt at a Time

Georgia Pellegrini. Da Capo

Lifelong Books, 256 pp. \$24

I've long believed the future of hunting is in the hands of foodies—the mostly urban folk who care deeply about the quality of their protein and where it comes from. Georgia Pellegrini is one such food fan. Schooled in French cuisine tradition and trained in four-star restaurants, she began to understand that eating meat requires someone to kill the animal. Soon the chef found herself “going one step farther,” from butchering geese and hogs to actually hunting wild game. She loved it. Hunting, she writes,



is even more fundamentally satisfying than gardening and cooking. In this book she travels for a year learning about hunting and hunting culture. Along the way she meets a few pigs—porcine and human—but mostly kind-hearted conservationists who welcome her into their hunting camps. There she learns the joys of pursuing game and the satisfaction that comes from preparing meals from animals you get to know intimately in the chase.

Mark of the Grizzly: True Stories of Recent Bear Attacks and the Hard Lessons Learned

Scott McMillion. Lyons Press, 304 pp. \$16.95

Since it was first published in 1998, this definitive book on grizzly attacks has sold more than 100,000 copies. No wonder. The author, *Montana Quarterly* magazine senior editor Scott McMillion, writes like a novelist but researches his topic like the seasoned journalist he is. After reading this newly revised edition, I

agree with Livingston author Tim Cahill, who writes, “This deft and gracefully written book is more terrifying than a shelf full of Stephen King novels.”

Atlas of Yellowstone

University of California Press, 296 pp. \$65

I received this in the mail, opened it, and was still reading when they turned out the office lights three hours later. This atlas is enthralling: maps and graphics of geysers, landforms, wildlife, traffic patterns, and more; a timeline of fires dating back to 1885; and diagrams that show annual peak streamflow of the park's major rivers, to name just a fraction of the contents. A vital, riveting source for anyone who has spent time exploring the world's first and perhaps still greatest national park.

Bull Trout's Gift: A Salish Story about the Value of Reciprocity

Confederated Salish and Kootenai Tribes. Illustrations by Sashay Camel. University of Nebraska Press, 70 pp. \$21.95

This lovely book is the centerpiece of a public education effort by the Confederated Salish and Kootenai Tribes as they work to restore the Jocko River drainage and its bull trout population. Beautifully illustrated, *Bull Trout's Gift* tells the story of this grand salmonid and its relationship with the Salish and Pend d'Oreilles people. Reviled until recently by sport anglers for its predatory habits on some of the more desirable species like rainbow trout, the bull trout is



central to the culture and religion of the native people who live in today's west-central Montana and east-central Idaho. Think of bull trout as their salmon and you'll begin to understand.

Call of the Mild:

Learning To Hunt

My Own Dinner

Lily Raff McCaulou,

Grand Central

Publishing, 336 pp.

\$32.99

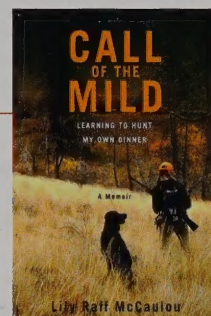
When Lily Raff McCaulou moved from New York City to rural Oregon to work at a small newspaper, she quickly learned that to understand the people she wrote about, she needed to understand hunting. Terrified of guns and disdainful of

killing, the young journalist at first struggles to reconcile her past perceptions of “gun nuts” and “blood-thirsty killers” with the thoughtful, environmentally minded hunters she meets in her quest to procure her own

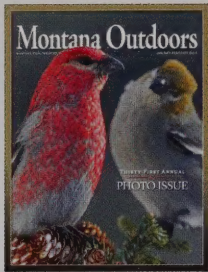
meat. Not only does she learn to hunt, Raff McCaulou, like *Girl Hunter* author Georgia Pellegrini, learns to love hunting. In the process, she gains insight into hunting culture, wildlife conser-

vation, and the paradox of loving animals while occasionally killing some. She also offers readers a look at how antihunting urbanites view hunting and the great and growing gap that exists between those of us who kill the ani-

mals we eat and the many more who choose not to. 



2012 MONTANA OUTDOORS INDEX



JANUARY-FEBRUARY 2012

Annual photography issue



MARCH-APRIL 2012

Visions of What Once Was and May Be Again

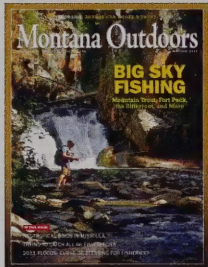
Montana's wildlife art legacy captures the state's untamed heritage and inspires contemporary audiences to recover what has been lost. By Todd Wilkinson

Building a Better Bear Trap Webcams, temperature sensors, and satellite technology allow FWP biologists to see and monitor what's in a culvert trap many miles away. By Christine Paige

How a Great Place Was Saved Montana, British Columbia, Canada, and the United States work out a remarkable deal that protects the pristine North Fork of the Flathead region. By Scott McMillion

Love Birds Spectacular courtship displays of 12 Montana species. By Ellen Horowitz

Shining a Light on Moose Are these popular big game animals disappearing from parts of Montana? FWP research biologists search for better ways to track population trends while learning what causes the large, long-legged forest dwellers to die. By Tom Dickson



MAY-JUNE 2012

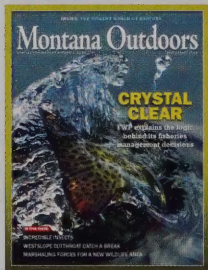
The Flip Side of Floods Though a curse to river towns and nearby farms, high water like that in 2011 can be a blessing for fish populations and aquatic ecosystems. By Jeff Erickson

Aiming for 86 Each in his own way, a schoolboy and a retiree are trying to catch as many of Montana's different fish species as possible. By Nick Gevock

The River that Does It All Despite booming residential development and growing angling pressure, the Bitterroot continues to provide superb trout fishing while maintaining pristine coldwater habitat for imperiled native fish. How long can that last? By Daryl Gadbow

The Water Is Up, and Peck Is Back When water filled Fort Peck last year and flooded its shorelines, a storehouse of nutrients washed into the reservoir. That triggered an ecological chain reaction, creating some of the best fishing in years for walleye, northern pike, smallmouth bass, and other species. By Andrew McKean

High-Altitude Trout What backpackers and hikers have discovered about the state's fish-rich alpine lakes. By Mike Raether



JULY-AUGUST 2012

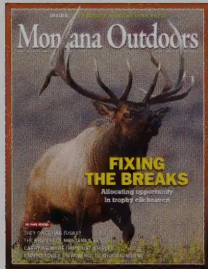
Beware the Deadly Talon Neck-breaking, disemboweling, constricting, and snagging—the violent world of raptors. By Ed Yong

Why We Do It This Way FWP unveils a new plan that explains the agency's approach to managing Montana's diverse and complex fisheries. By Tom Dickson

A Big Win for the Westslope Genetically pure westslope cutthroat populations in the Upper Missouri Basin have dwindled to less than 5 percent of their original range. The ambitious Cherry Creek restoration is helping stem that loss. By Todd Wilkinson

Phylum Arthropoda. Photo essay

Where It All Comes Together Purchased last year with



overwhelming local support, the scenic new Marshall Creek Wildlife Management Area is home to grizzly bears, lynx, elk, and bull trout. The area also draws thousands of hunters, snowmobilers, campers, and anglers each year. By Todd Tanner

Under the Radar The all-volunteer U.S. Coast Guard Auxiliary is the most important water safety force you've never heard of. By Dave Carty. Photos by Kenton Rowe

SEPTEMBER-OCTOBER 2012

Getting to No. 1 The stories behind Montana's largest big game trophies. By PJ DelHomme

Rocky Mountain Ivory Prized for centuries as jewelry and hunting mementos, the modern elk's small canine teeth are remnants of tusks once grown by its prehistoric ancestors. By Ellen Horowitz

Who Gets a Shot? The ongoing struggle to allocate archery hunting opportunities for trophy elk in the Missouri Breaks region. By Scott McMillion

Terror at Soda Butte Grizzlies rarely attack humans with an intent to kill. Yet, tragically, a female bear became predatory two years ago at a U.S. Forest Service campground near Cooke City. Investigators still don't know why. By Scott McMillion

Grandpa's Gun Each time I took the old rifle into the mountains, I carried more than just a firearm. By Robert Love

Back-to-School Special Expert tips for adult hunters rusty on the basics of hunting safety and survival. By Andrea Jones

Silver Bow Begins Bouncing Back Thanks to state and federal remediation, this Butte-area stream is showing hints of its cutthroat trout fishing potential. By Tom Dickson

NOVEMBER-DECEMBER 2012

Catching Great Air A research scientist documents the remarkable aerodynamic adaptations of northern flying squirrels. Article and photographs by Alexander V. Badyaev

Trolls on Ice How my son and some mythological creatures taught me the joys of fishing through frozen water. By Ben Long

Please Do Disturb Why FWP is using "low-intensity logging" to mimic natural disturbances on some forested wildlife management areas. By Tom Dickson

Why I Hunt By Todd Tanner. Paintings by Thomas Aquinas Daly

Fly-Fishing with Frozen Fingers The combination of ice, wind, snow, and lethargic fish makes the idea of chasing trout in midwinter seem absurd. Until you actually try it. By Ben Romans

Searching for Wolverines in the West Cabinets

Last winter, nearly 150 volunteers spent 2,000 hours trying to capture images of the elusive furbearer with trail cameras in a remote wildlands area along the Montana-Idaho border. By Aaron Theisen



ONLINE: All stories from 2002–2012 issues are available on-line at fwp.mt.gov/mtoutdoors/. The complete archives of *Montana Outdoors* and predecessor publications (*Montana Wild Life*, *Sporting Montana*, and *Montana Wildlife*) dating back to 1928 are available on-line at archive.org.

BACK ISSUES are \$3.50 each. Send your request along with payment to: *Montana Outdoors*, P.O. Box 200701, Helena, MT 59620-0701.

Snow bunting

Plectrophenax nivalis

By Ted Brewer

If ever a bird represents cold temperatures, it's the snow bunting, a winter visitor to Montana from the far north. There's the name, appropriate for the bright white plumage both males and females wear during breeding season. And there's the fact that the best chance of seeing these birds in Montana is after a snowstorm, along a roadside where the birds feed on exposed weed and grass seeds unavailable in the buried fields. What's more, snow buntings thrive in frigid conditions, playing and singing even while winter storms rage around them in temperatures of -25 F or lower.

There's also this tidbit: Most of the snow bunting's breeding grounds lie above the Arctic Circle. No songbird breeds as far north as the snow bunting.

BREEDING

Males journey from Montana back to their breeding grounds on the tundra in late winter, when nighttime temperatures in the Arctic still drop down to -20 degrees (females follow four to six weeks later). Males migrate early to establish and defend territories that hold promising nesting sites. To keep warm, males burrow into the snow. They also roost and forage together in flocks of up to 80 individuals.

The cold is also no object when it comes to choosing nest sites. Nests are constructed in deep crevices within rocks—places safe from predators but chilly. To keep the clutch of two to seven eggs warm, the female lines the nest with fur and feathers and rarely leaves. The male forages for insects, then feeds the female on the nest, just as both sexes will later feed the nestlings.

IDENTIFICATION

Snow buntings are medium-sized songbirds of the longspur family, roughly 7 inches long with a wingspan of 14 inches. Though not

completely lacking darker colors, they show the most white of any similar-sized bird living in Montana, making them easy to identify.

Unfortunately, we in Montana don't get to see their glorious breeding plumage. When snow buntings are here, pale ginger tips, acquired during the fall molt, veil the pure-white feathers that cover most of their body. During winter, the male bunting rubs these dark outer tips across the snow, wear-

and female have indistinguishable plumage color before and after the breeding season, from March through August.

Like other buntings and longspurs, the snow bunting has an elongated hind claw.

TERRITORIAL DEFENSE

Renowned Dutch ornithologist Nikolaas Tinbergen named one of the snow bunting's defense tactics the "song-fight." The male flutters up steeply, then sails down in the direction of the intruder, body curved upward, wings trembling in a horizontal position, all the while singing at the top of his lungs. The trespassing snow bunting male usually flees, though ornithologists have witnessed fights in which combatants locked feet and bills and tumbled across snow and rocks.

Scientific name

Plectrophenax is derived from the Greek *plektron* (rooster's spur) and *phenax* (imposter, in reference to the elongated hind claw).
nivalis is Latin for "snowy."

ing them down. By breeding season, he is again sporting his brilliant white plumage, made all the more striking by the streaks of jet black running down his back and across his wingtips. The female at this time looks similar, though her head is white with dark streaks, while his is pure white.

With a few minor exceptions, the male

CONSERVATION STATUS

Throughout their range in the Arctic and Montana, snow buntings are common and widespread, though numbers vary greatly from year to year in any one area. Because snow buntings need snow and cold, our increasingly warmer winters are the species' primary long-term threat. 🐼



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PARTING SHOT



GOLDEN NEEDLES The amber hues of larch (tamarack) light up the Cabinet Mountain foothills. Photo by Tim Cady.



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